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Technical Baseline for the Long-Term Stewardship National Program (Draft)

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FOREWORD

There is a growing recognition that many of the world's hazardous and radioactively contaminated waste sites will not be sufficiently remediated to allow unrestricted land use. Funding and technology limitations preclude cleanup to pristine conditions. The Department of Energy (DOE) will have responsibilities to monitor and safeguard (i.e., long-term stewardship) more than 100 sites that contain residual contamination. Long-Term Stewardship (LTS) encompasses all activities, including physical and institutional controls, information, trending and re-remediation and other mechanisms required to protect human health and the environment from hazards remaining after cleanup is complete. The DOE sponsors long-term stewardship activities through several mechanisms depending on the type of site, complexity of site, and status of the site.

The purpose of this LTS National Program Technical Baseline (draft) is to provide and collate detailed site information to support current and future planning and management decisions and activities; in particular the Science and Technology (S&T) Roadmap. This baseline is a summary of data gathered on 113 current and anticipated LTS sites from the 143 sites previously identified. Specifically, the report presents:

1. LTS sites and areas within these sites later defined as subsites and subportions, where LTS is anticipated to be required.

2. Projected schedules for site transitions (from cleanup to LTS activities, regardless of fund source)

3. Principal contaminants

4. Site geographic and technical information

5. Projected end-states

6. Other information deemed critical to safely perform LTS operations and develop the needs basis for the Roadmap.

The data behind the report are presented using complex-wide data rollups and specific combinations of the sites' physical states (end-states) and LTS activities, or scenarios. Future display of the data can be made to support various needs.

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EXECUTIVE SUMMARY

The Department of Energy (DOE) is the steward for approximately 143 sites where the development of missions of national relevance left a legacy of hazards. DOE is, therefore, engaged in assessing its long-term liability at each of these sites, to carry out its stewardship activities. This report relays information on 113 of the 143 sites.

Several efforts have been made over the last three years to gather pertinent information regarding these sites and their current status. Applicable data from these sources have been summarized in this Technical Baseline Report.

The LTS technical baseline is a summary of data gathered on 113 sites, 211 sub-sites, and 921 subportions, including DOE and non-DOE sites. Not all sites are in the database (refer to Section 2.3 Data Exclusions and Limitations. The data presented in this report constitute an aggregation of information and is intended to serve as the starting point for a number of analyses to be performed by the LTS National Program.

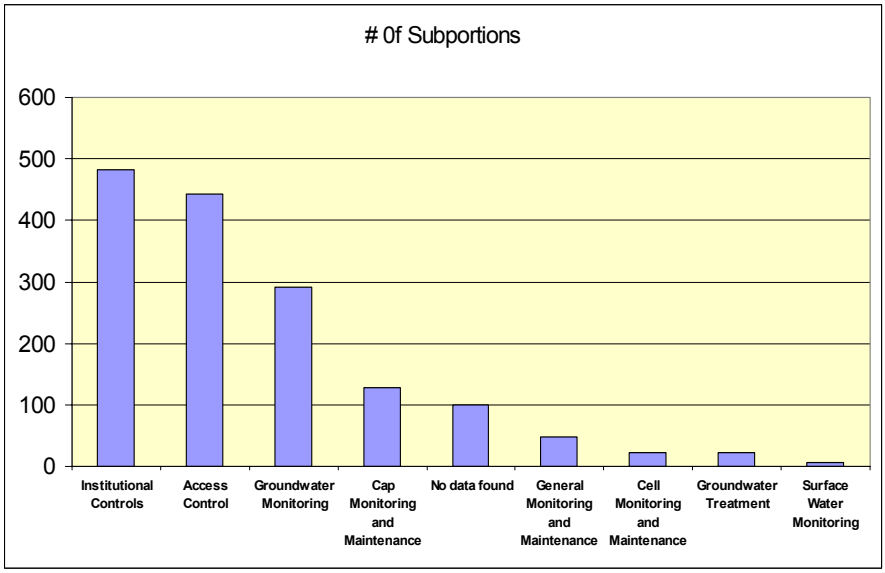


Figure ES-1. Distribution of Subportions by LTS Activity

The intent of this report is to consolidate site-specific information, such that the consolidated volume of data can be of use to make evaluations by other groups within the National Long-Term Stewardship National Program (LTS), such as LTS Science and Technology (S&T) Roadmapping. From that regard, emphasis is placed on the type of information that will most likely be required to perform activities in the implementation of the LTS National Program. These activities are broken down at a high level as they supported the primary objectives of the program, namely, Program Execution, Transition into LTS, LTS Operation, LTS Operations Improvement, and Transition out of LTS (see Figure ES-1). From these, LTS Operations and LTS Operations Improvement constitute the focus of the data contained in this report.

A discriminator in this report is the development and presentation of "scenarios" - a situation resulting from the combination of an end-state and the corresponding LTS activities, and a systematic process to evaluate the potential benefit in addressing a series of complex-wide issues that may surface, such as the increase in cap breach or contaminant migration occurrences throughout the complex. A simple query can be made and a cost-benefit analysis could be run to determine the degree of severity and risk, and the possibility of developing (or deploying) a

technology capable of reducing the maintenance cost of a site. Several examples are given and two are further developed.

The data gathering effort for this report was limited to that information that could be found in publicly available sources, without contacting the individual sites. This approach presented a significant challenge in that the level at which the various sites had broken down their data was different and, therefore, the consolidated collection of data contains a number of inconsistencies, which need to be corrected in FY02. However, the presentation of the data in this report suggests that it could be of high value to site operators, stakeholders, funding sources, the R&D community, as well as other interested parties.

The data are grouped by subportion, an area within a subsite with distinct characteristics in terms of the media type. A subsite is larger than a subportion, yet still a section of a site. In case of a site with one subportion, the site, subsite and subportion are the same (i.e.: most UMTRCA sites). Given these definitions, the 921 subportions are then divided by the medium in which the contaminants are located, such as soils, engineered units, groundwater, facilities and surface water/sediments. Much of the data display in this report was chosen with the proposed LTS activities in mind. These include monitoring, institutional controls, and treatment, among others. Data can easily be displayed with alternate emphasis by running a new query.

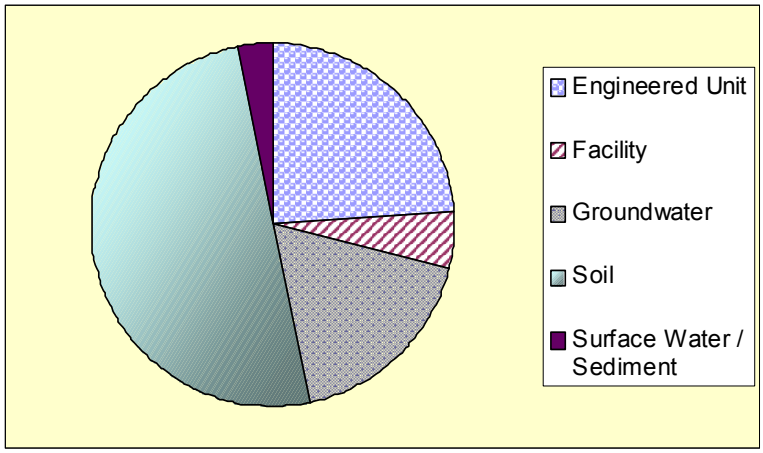


Figure ES-2. Distribution of Subportions by Contaminant Media

The total volume of contaminated media that will be left in place (committing sites to LTS) has been previously reported as a rough estimate, and includes 22 million cubic meters of soil, 18 trillion cubic meters of groundwater, 114 million cubic meters of engineered units (disposal cells), 772 thousand cubic meters of surface water and sediment, and 73 thousand cubic meters of facilities. These volumes, however, are likely to change as sites complete characterization and remediation.

Six sites were examined in more detail and reported as “case studies”. Each of these sites is meant to illustrate general categories of sites. Two of such sites are the Nevada Test Site (NTS) representing a “detonation” site and the Idaho National Engineering and Environmental Laboratory (INEEL), representing a site with a continuing mission and a variety of waste types. The value of arranging the data in this fashion is that any one site can be compared to the entire complex and, at the same time, a site-specific plan can be derived for LTS purposes. This may be of interest when trying to decide what sites may be suitable for a particular test, based on media type, contaminant, climate, stakeholders, and potential general benefit from the test results.

From a time perspective, the estimated number of subsites under LTS climbs rapidly until 2008 with 163 subsites, peaks in 2016 with 174 subsites, and declines steadily from 150 to 115 subsites, between 2035 and 2099. Once the waste volume information is obtained for all subsites, a more representative value of potential costs (and benefits) could be derived. This is, however, an early indication of when these sites or portions thereof are intended to come into the LTS National Program.

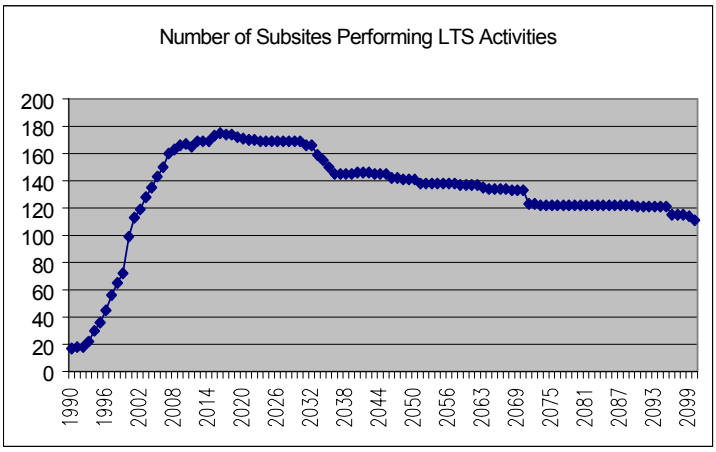


Figure ES-3. Number of Subsites Performing LTS Activities

The appendices contain complete lists of the same data used to build some of the charts in the report or a specific set of data, relating to a given scenario. Appendix A offers a complete listing of the data fields, classified by site, subsite and subportion. This represents the *desired* data, and should not interpreted as all data gathered. There were fields completely empty across the complex, yet the need for that type of information was identified to perform some function under LTS. This means that that information will be gathered in FY02, once access to the sites is granted.

The recommendation and path forward is the verification and validation of the Technical Baseline data, with a standardized set of definitions, as to ensure that any analyses performed with such data can be used with a higher degree of confidence.

CONTENTS

FIGURES AND TABLES

ACRONYMS

Ac	Actinium
AEC	Atomic Energy Commission
Ag	Silver
Al	Aluminum
Am	Americium
Am-241	Americium-241
ANC	American Nuclear Corporation
As	Arsenic
AZ	Arizona
B	Boron
Ba	Barium
Be	Beryllium
Bi	Bismuth
BLM	Bureau of Land Management
BTEX	benzene, toluene, eythl benzene, Xylene
C	Carbon
C-14	Carbon 14
CA	California
Ca	Calcium
Cd	Cadmium
Ce	Cerium
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CID	Central Internet Database
Cl	Chlorine
CO	Colorado
Co-60	Cobalt-60
Cr	Chromium
Cs	Cesium
Cs-137	Cesium-137
CT	Connecticut
Cu	Copper
DART	Decision Analysis for Remediation Technologies
D&D	Decontamination and Decommissioning
DCA	Dichloroethane
DCE	Dichloroethene
DDT	dichlorodiphenyltrichloroethane
DNT	Dinitrotoluene
DOE	Department of Energy
EM	Environmental Management (Program)
EPA	Environmental Protection Agency
ER/WM	Environmental Restoration/Waste Management
Eu	Europium
F	Fluorine
Fe	Iron
FEMP	Fernald Environmental Management Project
FL	Florida
Fr	Francium
FUSRAP	Formerly Utilized Sites Remedial Action Program
GJO	Grand Junction Office
GW	Groundwater
GWPS	Groundwater Protection Standards
H	High
H2SO4	Sulfuric Acid
H-3	Tritium
HE	High Explosive
Hg	Mercury
HMX	high melt explosive
HRS	Hazard Ranking System
ID	Idaho
IL	Illinois
I-129	Iodine-129
INEEL	Idaho National Environmental and Engineering Laboratory
IPABS	Integrated Planning, Accountability, and Budgeting System
K-40	Potasium-40
KY	Kentucky
L	Low

Li	Lithium
LLMW	Low Level Mixed Waste
LLNL	Lawrence Livermore National Laboratory
LLW	Low Level Radioactive Waste
LTS	Long-Term Stewardship
LTSM	Long Term Surveillance and Maintenance
M	Medium
MED	Manhattan Engineer District
MEMP	Miamisburg Environmental Management Project
Mg	Magnesium
mg	milligram (one-thousandth of a gram)
mg/L	milligrams per liter
MGD	million gallons per day
MGY	million gallons per year
mi	miles
ml	milliliter
Mn	Manganese
Mo	Molybdenum
N	Nitrogen
Na	Sodium
NEPA	National Environmental Policy Act
Ni	Nickel
Ni-63	Nickel 63
Np	Neptunium
Np-237	Neptunium-237
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NRDC	Natural Resources Defense Council
NY	New York
NWPA	Nuclear Waste Policy Act
NV	Nevada
O&M	Operation and Maintenance
OH	Ohio
ORNL	Oak Ridge National Laboratory
OU	Operable Unit
P	Phosphorus
P&T	Pump and Treat
Pa	Protactinium
PA	Pennsylvania
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PCB	Polychlorinated Biphenyol
PCE	Perchloro Ethene
Pd	Palladium
Pm	Promethium
Po	Polonium
POC	Point of Contact
PSO	Principal Secretarial Office
Pu	Plutonium
Pu-238	Plutonium-238
Pu-239	Plutonium-239
Pu-240	Plutonium-240
Ra	Radium
Ra-226	Radium-226
RCRA	Resource Conservation and Recovery Act
RD/DA	Remedial Design/Remedial Action
RDX	research development explosive
RI/FS	Remedial Investigation/Feasibility Study
Rn	Radon
ROD	Record of Decision
Ru	Ruthenium
Sb-125	Antimony 125
SC	South Carolina
SCFA	Subsurface Contaminants Focus Area
Se	Selenium
Sn	Tin
Sr-90	Strontium-90
SRS	Savannah River Site
SVOC	Semivolatile Organic Compound
S&T	Science & Technology
TATB	triaminotrinitrobenzene
Tc	Technetium
TCA	Trichloroethane
TCE	trichloroethene
Te	Tellurium
Th	Thorium
Tl	Thallium

TDEC	Tennessee Department of Environment and Conservation
TN	Tennessee
TNB	trinitrobenzene
TNT	trinitrotoluene
TOC	Total Organic Concentration
TOX	Total Organic Halogens
TPH	Total Petroleum Hydrocarbon
TRU	Transuranic
TVA	Tennessee Valley Authority
TX	Texas
U	uranium
U (depleted)	Uranium (depleted)
U-234	Uranium-234
U-238	Uranium-238
UMTRCA	Uranium Mill Tailings Radiation Control Act
U.S.	United States
UT	Utah
UTL	Upper Tolerance Limit
UTM	Universal Transverse Mercator
V	Vanadium
V&V	Validation and Verification
VOC	Volatile Organic Compound
WA	Washington
WAC	Waste Acceptance Criteria
WBS	Work Breakdown Structure
WIPP	Waste Isolation Pilot Plant
WSA	Weapons Storage Area
WSRC	Westinghouse Savannah River Company
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant
WY	Wyoming
yd3	cubic yards
yr	year
Zn	Zinc
Zr	Zirconium

1 INTRODUCTION

The Long-Term Stewardship (LTS) Technical Baseline Report is intended to provide detailed site data, which may be of use to the LTS S&T Roadmap Group to evaluate alternate courses of action for any one site or a group of sites.

Residual contamination and waste will remain at more than 100 sites, which the Department of Energy (DOE) will have responsibilities to monitor and safeguard (i.e., long-term stewardship). Long-term stewardship encompasses all activities, including physical and institutional controls, institutions, information, and other mechanisms (e.g., decision analysis) required to protect human health and the environment from hazards remaining after cleanup is complete.

The draft mission of the Long-Term Stewardship National Program is to maintain and continuously improve protection of public health, safety, and the environment at a site or portion of a site assigned to DOE for such purposes. Specific program mission elements may include:

- Provide sustained human and environmental well-being through the mitigation of residual risks and the conservation of the site's natural, ecological, and cultural resources
- Maintain "post-cleanup" controls on residual hazards
- Sustain and maintain engineered controls, infrastructure, and institutional controls
- Seek to avoid or minimize the creation of additional "post-cleanup" long-term stewardship liabilities during current and future site operations
- Enable the best land use and resource conservation within the constraints of the contamination present
- Periodically reevaluate the priorities and strategies in response to changes in knowledge, science, technology, site conditions, or regional setting
- Coordinate activities to identify and promote additional research and development efforts needed to ensure this protection and to incorporate new science and technology developments that result in increased protection of human health and the environment and lower costs.

The Long-Term Stewardship National Program will not only be accountable for stewardship at DOE sites, but may also be responsible for other non-DOE sites as declared by federal law. These additional sites are known as Formerly Utilized Sites Remedial Action Program (FUSRAP), Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) Title I and II, and Nuclear Waste Policy Act (NWPA) 151(b) and may include NWPA 151(c).

The Department of Energy (DOE) is conducting LTS activities at many sites around the complex. As cleanup activities are completed, sites will transition into DOE's LTS National Program or to the Long-term Surveillance and Maintenance (LTSM) Program. The purpose of the LTS National Program is to bring a consistent approach to the implementation of the Department's LTS program, and to ensure that adequate planning is conducted to support the

LTS mission across the complex. LTS activities are performed at most sites and are funded and managed by a variety of DOE organizations. A technical baseline was needed to consolidate and establish a common, national basis for the Department's LTS activities.

Since the Roadmap needs to look at LTS activities, the technical baseline takes a snapshot of activities ongoing and projected and does not distinguish between funding sources. In other words, if a section (subportion) of a larger site has completed remediation and there are ongoing LTS activities being performed by EM-40 (for example) at that section (subportion) it is included in the data. Likewise, sites that have not completed any remediation are included but have less detail and higher uncertainty (see section 2.4 Data Uncertainties). Because the technical baseline does not distinguish between funding sources, it is more applicable to the Roadmap in that when a subportion is ready for LTS activities, the DOE must have technologies available to perform those activities, regardless if the site has transitioned into the LTS National Program or LTSM Program. The technical baseline consolidates LTS activities, costs, schedules, etc. from the various organizations. This effort supports the coordination of activities, provides an improved basis for planning of future LTS activity, and provides interested stakeholders and program managers sufficient information to understand the magnitude of the Department's LTS problem.

This report presents currently available baseline data in rollup and scenario formats. Rollups are collations of the data by attributes against defined criteria, such as the number of subportions that require groundwater monitoring. Scenarios are specific rollups that present information organized around final state or use, and can include summaries by physical attributes (including contaminants), completed or anticipated remedial activities, and other factors. For example, a scenario may be the subportions with EPA toxic metals in disposal cells, who the relevant Stakeholders are for those subportions, and what regulations are applicable to those subportions. Not included in this report are those rollups and scenarios for which sparse or unsupported data are available. However, the data provided will allow for initial LTS activities such as development of the S&T Roadmap. During FY02, refinement of the data will be performed as the need is identified.

1.1 Purpose

Long-term stewardship (LTS) involves the management of sites where the Department of Energy (DOE) or other designated agencies have completed or plan to complete cleanup activity to the designated residual contaminant levels. Under current plans and agreements, DOE Environmental Management and other entities will leave behind residual levels of radioactive contamination and other residual hazards that must be managed. Planning and management decisions will be site specific and depend upon many factors including speciation and levels of contaminants, land use, various physical attributes, stakeholder agreements and attitudes, and site missions. In general the technical baseline is intended to provide and collate detailed site information to support current and future planning and management decisions and activities as indicated in the S&T Roadmap. Specific uses of the baseline include collation and configuration management of site descriptions, liability assessment, problem definition, roadmap development, stakeholder networking and education, decision support, planning for technology investment, and lessons learned. Users are anticipated to be the LTS National Program, Regulators at all levels, governments (Tribal, state, local), site owners, and stakeholders including local residents and various non-governmental organizations.

The baseline development effort has (and will continue to) interface with the other teams in the LTS National Program to ensure cohesiveness of operation and ease of integration. These teams are developing overall LTS requirements, generating roadmaps, defining and performing decision analysis, and organizing and performing LTS information and records management.

1.1.1 Roadmap Development

Development and publication of the Technical Baseline is intended as an early component of the LTS S&T Roadmap development effort. Many of the scenarios and evaluations that will be made later in the program depend greatly on the ability to quantify challenges (i.e., capability and usage gaps) in the LTS program and any ties that might be established between those challenges and available or emerging S&T resources. The LTS S&T Roadmap will use a structured, systematic approach to assess current capabilities against LTS issues and functions to identify S&T capability and usage gaps (i.e., areas where S&T is needed), and establish associated program goals for S&T. Specifically, current site conditions and anticipated end-states defined in this LTS Technical Baseline reports will be used to develop LTS S&T objectives and define technical and programmatic needs and functions. To that end, the definition of the data quality and granularity for the baseline was reached with the Roadmap Team's consensus.

1.1.2 Requirements Development

The complete set of LTS requirements is being developed. However, the first and second tier requirements have been identified and connected to the corresponding LTS activities. These activities, in turn, have been used to validate the baseline data definitions, allowing for the baseline content and organization to be derived from a current estimate of information requirements necessary to answer basic planning and managerial questions.

1.1.3 Program Management

The technical baseline data gathered and presented in this report provides program managers cross-site information to assist in building a better understanding of DOE liabilities. The ability to access and rollup subportion data for individual LTS sites allow the characterization of complex LTS issues into more clearly visible and understandable domains. The ability to layer and categorize data facilitates understanding and it is this understanding which is significant to program managers and decision-makers in anticipating future requirements and commitments, while also providing a basis for resource allocation decisions. Additionally, the ability to correlate problems and issues across multiple sites provides insight for prioritizing activities and injecting new technologies to achieve the maximum benefit and maximizing the greatest return on investment. The baseline information may also bring to light cases in which the most economical or technically efficient means to address LTS responsibilities is not necessarily the best choice in terms of maintaining public trust and support.

1.1.4 Decision Analysis

The LTS decision analysis effort supports the dual objectives of identifying the fundamental decisions necessary to plan and execute the LTS process, and characterizing the required decision mechanisms and supporting processes. This activity is ongoing. Input to the development of the technical baseline included a definition of data fields derived from the LTS decision process flow. These were compared with the technical baseline structure but did not

serve as a basis of requirements for that structure. Anticipated FY-02 work scope will focus on formal development and documentation of the decision process including methodology, criteria, and metrics to support the principal Stewardship decisions. These will contain data and data processing requirements that will be reviewed against the contents and capabilities of the technical baseline itself.

1.1.5 Information and Records Management

As DOE sites make the transition from cleanup to long-term stewardship, site stewards will need detailed, accurate information about the location, condition, and status of residual hazards; the processes and cleanup strategies that generated these hazards; and whether engineered controls, institutional controls, and monitoring systems are performing as designed. The specific activities at a site that depend on LTS information will depend on several factors, including the nature, duration, and extent of residual hazards, the type and condition of control and monitoring systems, and the nature of threats to affected parties and ecological receptors.

LTS information at a given sites may be used by a variety of parties, including site stewards, regulators, affected parties (states, local governments, Tribes), and the public. LTS information may include a variety of media, including electronic data, documents, maps, drawings, and audio tapes. LTS information will need to be preserved for long periods of time, perhaps in perpetuity, and also will need to be available in a useful and readily accessible and understandable form.

Therefore LTS information management is to ensure that information necessary to plan and execute LTS activities (including providing information to stakeholders) is accurate, complete and available over the many years of stewardship. Development of the LTS technical baseline is a precursor to the information and records management activities. It is a complementary activity that provides an initial “snapshot” of the LTS problem. Information gathered for the baseline and the insights gained during development of the technical baseline will serve as useful inputs to later information management activity. The technical baseline does not address the records management portion of this activity. Next FY the IM team will manage the required information required by all LTS Business Functions through the use of a “data model”, which will define the desired data attributes for LTS.

2 PROJECT OVERVIEW

Long-term stewardship is defined as the physical controls, institutions, information, and other mechanisms (e.g., decision analysis) needed to ensure protection of people and the environment at sites where DOE has completed, or plans to complete, cleanup (e.g., landfill closures, remedial actions, removal actions, and facility stabilization). Long-term stewardship encompasses the set of activities necessary to protect human health and the environment from hazards posed by residual contamination and/or wastes remaining at sites (or portions of sites) once cleanup is complete.

Stewardship activities include:

- Site monitoring and maintenance of engineered controls (e.g., surveillance activities, inspections, ongoing pump and treat activities, cap repair, maintenance of entombed buildings or facilities, and maintenance of other barriers and containment structures)
- Application and enforcement of legal or other mechanisms (often referred to as institutional controls) to restrict land and water use
- Information management (e.g., record-keeping activities)
- Environmental monitoring (e.g., groundwater monitoring)
- Contingency planning for emergency responses
- Decision analysis, performance assessment (e.g., failure trending), and risk appraisal
- Enhanced environmental remediation or controls, if required or beneficial.

As discussed above, the main purpose of the technical baseline is to support the development of the LTS S&T Roadmap. In order to provide useful information on the sites that will undergo (or are undergoing) LTS, it was imperative to understand what activities or functions are performed as a part of LTS (see Figure 2-1).

Development and publication of the Technical Baseline is intended as an early component of the LTS S&T Roadmap development effort. Many of the scenarios and evaluations that will be made later in the program depend greatly on the ability to quantify challenges (i.e., capability and usage gaps) in the LTS program and any ties that might be established between those challenges and available or emerging S&T resources. The LTS S&T Roadmap will use a structured, systematic approach to assess current capabilities against LTS issues and functions to identify capability and usage gaps (i.e., areas where S&T is needed), and establish associated program goals for S&T. Specifically, current site conditions and anticipated end-states defined in this LTS Technical Baseline reports will be used to finalizing LTS S&T objectives and define technical and programmatic needs and functions. To that end, the definition of the data quality and granularity for the baseline was reached with the Roadmap Team's consensus."

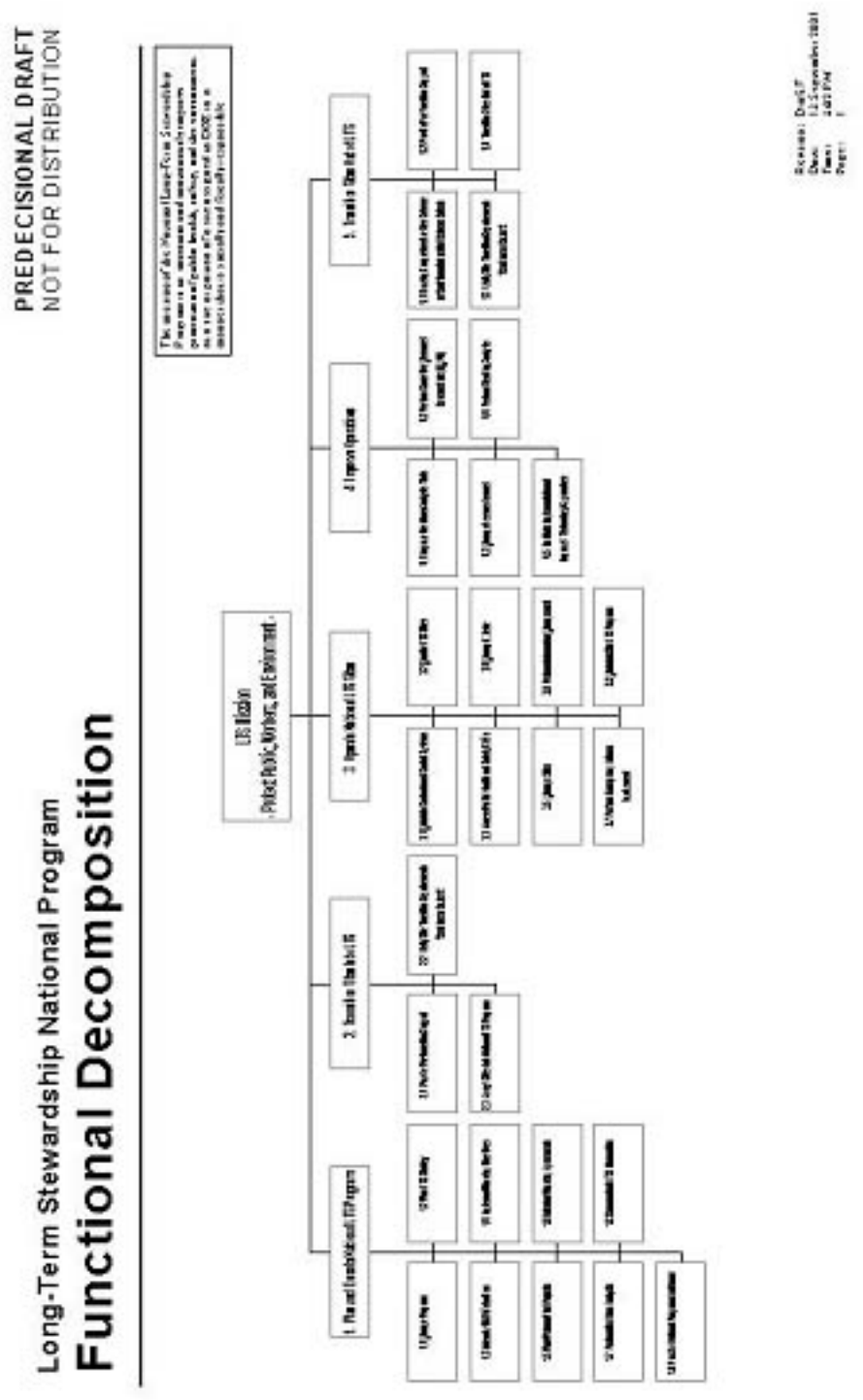


Figure 2-1. LTS Functional Decomposition Diagram

2.1 Data Organization/Definitions

To concisely describe the responsibilities of the LTS National Program associated with the sites is difficult because of the complexity and magnitude of many of the sites. To state the DOE is responsible for the stewardship of at least 113 sites does not adequately define the magnitude of the problem. Some sites are relatively small in size and have few contaminants and in one medium. Other sites are very large and have a multitude of contaminants and media. To address issues at a site level could result in a granularity problem because of the size and complexity differences. Thus, the data are organized by site, subsite, and subportion. An attempt has been made in this report to maintain compatibility with earlier data, but the data have been further detailed by activity, media type, and regulatory unit during the definition of subportions. All of these are necessary to support LTS planning and management decisions. Following is a description of sites, subsites, and subportions; Figure 2-2 provides an INEEL example of this data breakdown. Note that Appendix A provides the data elements and descriptions that were populated for development of the technical baseline.

- *Sites* are defined as high level, contiguous geographically distinct areas. There are 34 data fields within the technical baseline defined for each site. These can be categorized as general description (name, state, current managing field office and congressional district, narrative description, historical information, etc.), climate data (rainfall, snowfall, frost depth, etc.) summary of regulations and binding agreements, hazards and threats (EPA hazard ranking, threats and threat descriptions), lawsuit synopsis information (by case name and disposition), and summary of stakeholder issues and concerns. Each site may have multiple concerned stakeholders. 282 assignments of stakeholders and sites within the technical baseline were identified. These assignments are documented in Appendix F, Stakeholder Site Assignments.

- *Subsites* are geographically contiguous and distinct areas within a site. This may involve residually contaminated facilities, engineered units, soil, groundwater, surface water or sediments for which cleanup, disposal, or stabilization will be completed and long term stewardship required. Subsites are discrete subsets of sites that are subject to distinct management attention. Each site must have at least one subsite. There are 15 data fields within the technical baseline for each subsite. These include site name and description (hydrology, geology, area, population density, narrative, etc.), LTS schedule, demographics, and current and future land use.

- *Subportions* are the breakdown of subsites by media type and each subsite must have at least one subportion. There are 89 data fields associated with each subportion. These include general subportion description (names, media type and description, location, area, LTS schedule, etc.); principal secretarial office (PSO) and landlord data; current regulatory status; cost data; current, scheduled, or completed remediation and stewardship activities; contamination and cleanup data; facilities, engineered units and structures; stakeholder information; and contact information.

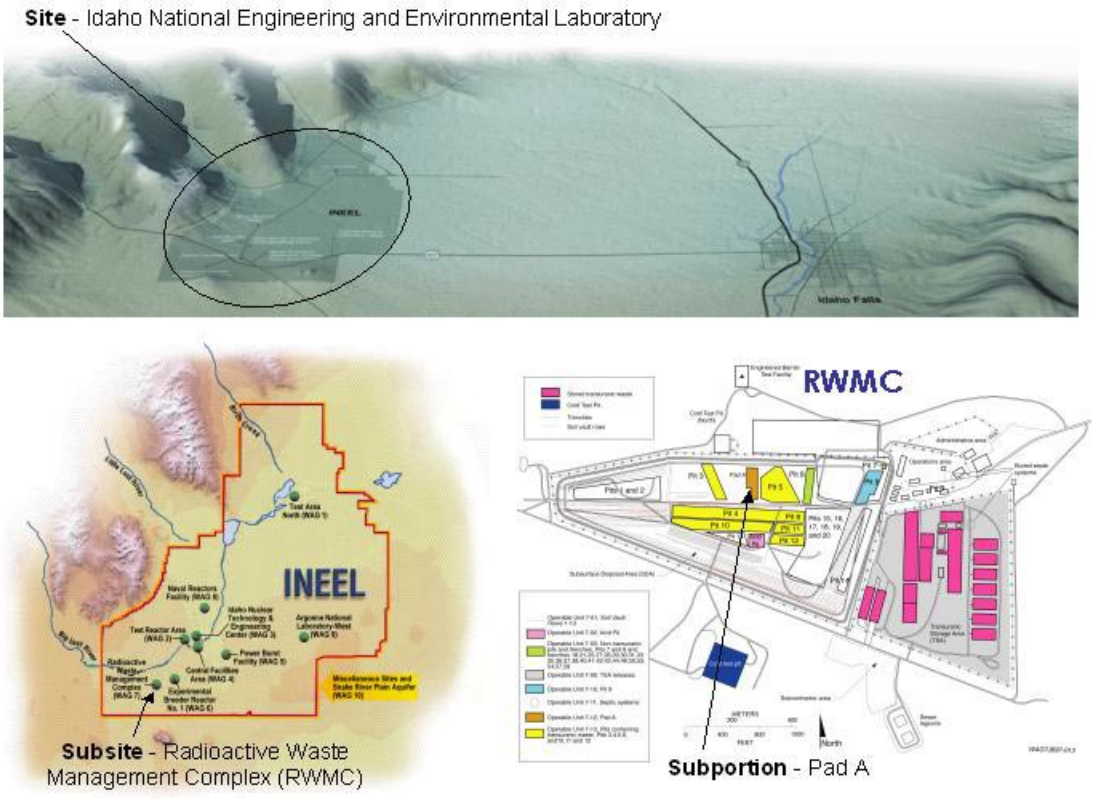


Figure 2-2. Example of site, subsite, and subportion

2.2 Data Sources

The data contained in this report were obtained through a variety of sources, including reports and databases such as The Report to Congress on Long-term Stewardship, Decision Analysis for Remediation Technologies (DART), Central Internet Database (CID), Integrated Planning, Accountability, and Budgeting System (IPABS), EPA records, Path to Closure Reports, and individual sites' web pages. It is fully recognized these sources are not completely current. Specific data sources for each site and subsite were recorded. Validation and verification (V&V) of the technical baseline data will be required in FY02 and beyond.

- *Decision Analysis for Remediation Technologies (DART)* is a database developed by the SCFA that contains site characteristic data, e.g. contaminants, waste depth, area, etc. for sites containing subsurface contamination across the DOE complex. The database also contains Subsurface Contaminant Focus Area (SCFA) requirements, needs, and technology information. DART was designed to support identification of remedial technology gaps and to establish technology development requirements based on the overall DOE complex needs, not just a single site.

- *Central Internet Database (CID)* is the first set of national level DOE waste management and cleanup data available to the public through the Internet and the first system to integrate data from multiple DOE sources into a single database. The CID contains nationwide data for radioactive waste, contaminated media, and spent nuclear fuel

- *Integrated Planning, Accountability, and Budgeting System (IPABS)* is the project-based management system that supports the Environmental Management (EM) Program. IPABS supports the EM Vision to complete cleanup at most sites by 2006 by providing stable business processes focused on supporting site closure and cleanup completion. IPABS consists of two major components: (1) The IPABS Handbook describes the top-level EM business processes (planning, budgeting, execution, and evaluation) and associated responsibilities necessary to fulfill the EM Vision and (2) The IPABS-Information System (IPABS-IS), along with the EM Corporate Database, provides the information and reports that support the IPABS Handbook and other EM information requirements.

- *The Report to Congress on Long-Term Stewardship* was the primary reference used to establish the technical baseline organization. The Report identifies sites or portions of sites where environmental restoration, waste disposal, and facility stabilization will be completed, but land use would be restricted. The Report to Congress describes the necessary management and LTS responsibilities for these areas, including cost, scope, and schedule, at a lower level of detail than in previous LTS reports. This document has also been referred to as the National Defense Authorization Act (NDAA) report because it addresses the NDAA Conference Report that requested the Secretary of Energy to submit a report to Congress on DOE's existing and anticipated LTS obligations at sites where environmental restoration activities are complete or will be complete by 2006.

- *The Paths to Closure Reports* reorganized the scope associated with the schedule and cost in the Baseline Reports into formal projects. The 1998 report articulated the vision of reducing the overall program cost by accelerating cleanup, completing projects, and closing sites, with a goal of achieving as much as possible by 2006. The 2000 Status Report updates life-cycle cost and schedule estimates. DOE addressed the need for LTS in these national summaries, but in response to significant public comment, a more complete consideration was deferred to a companion document. From Cleanup to Stewardship was published as a companion document to the 1998 Paths to Closure report and began to examine national policy issues, challenges, and barriers associated with the transition from cleanup to LTS. The document also provides a summary of the nature and extent of DOE's LTS responsibilities for soils, facilities, groundwater, surface water, and engineered units

- *Individual sites' web pages* provided a variety of information including climate, geology, regulatory breakdowns of waste areas, and access to documents which includes abstracts and summaries, as well as direct links to site-specific reports that have been published on the internet (Remedial Investigations, Feasibility Studies, Records of Decision, Work Plans, Annual Monitoring Reports, etc.).

2.3 Data Exclusions

Data provided for this Report are for planning purposes only and in no way preempt any ongoing or future regulatory or other decision-making processes. Site, subsites, and subportions where it is known that no LTS activity is in progress or planned are not included, nor are sites where the Department of Energy is not the responsible party for implementing stewardship. In addition, data was not included for Formerly Utilized Site Remedial Action Program (FUSRAP) sites,

Naval Nuclear Propulsion Program, and sites under NWPA Section 151(b) and (c). Each of these exclusions is discussed below.

Formerly Utilized Site Remedial Action Program (FUSRAP) sites are not included in this report but will be added in subsequent refinements. For the data sources that were available for this project, insufficient information was available on the anticipated FUSRAP sites. During the 1940s, 1950s, and 1960s, work was performed at sites throughout the United States as part of the nation's early atomic energy program. Some sites' activities can be traced back as far as World War II and the Manhattan Engineer District (MED); other sites were involved in peacetime activities under the Atomic Energy Commission (AEC). Both MED and AEC were predecessors of DOE. Most sites that became contaminated during the early atomic energy program were cleaned up under the guidelines in effect at the time. Because in most cases those cleanup guidelines were not as strict as today's requirements, trace amounts of radioactive materials remained at some of the sites. Over the years, contamination was spread to other locations, either by demolition of buildings, intentional movement of materials, or by natural processes. DOE began FUSRAP in 1974 to study these sites and take appropriate cleanup action. When a site is thought to be contaminated, old records are reviewed and the site is surveyed. If contamination is found that is connected to MED or AEC activities, cleanup is authorized under FUSRAP. Some sites with industrial contamination similar to that produced by MED or AEC activities have also been added to FUSRAP by Congress. The Energy and Water Development Appropriations Act for FY 1998 P.L. 05-62, signed into law on October 13, 1997, transferred responsibility for the administration and execution of the FUSRAP from the DOE to the U. S. Army Corps of Engineers. Subsequently, DOE and the Corps completed a Memorandum of Understanding that requires DOE to take responsibility for sites after cleanup (beginning two years following closure of the cleanup project) and to conduct required LTS activities. The extent of DOE's LTS responsibilities will depend on the final cleanup decisions made for each site (uncertain at this time).

In addition, this report does not include sites managed by the Naval Nuclear Propulsion Program -- a joint DOE/U.S. Navy program. The excluded sites are the Knolls Atomic Power Laboratory near Schenectady, NY; Kesselring Site, located about 25 miles north of the Knolls Atomic Power Laboratory near West Milton/Saratoga Springs, NY; the Bettis Laboratory, near Pittsburgh, PA; the Windsor Site of the Knolls Atomic Power Laboratory in Windsor, CT; and the Naval Reactors Facility located at the Idaho National Engineering and Environmental Laboratory.

This report does not include low-level radioactive waste sites under NWPA Section 151(b) and (c) except for one for which DOE already has long-term stewardship responsibility (the Parkersburg Site in West Virginia). The other sites are excluded because of the uncertainty as to whether such sites will be transferred to DOE for long-term stewardship (see Section 2.1.4, Data Uncertainties). These sites include low-level radioactive waste disposal sites and low-level radioactive waste sites at certain ore processing facilities -- both of which have been or will be remediated by their commercial owners and for which DOE may be authorized (under certain conditions) to take title to the waste and land for long-term stewardship.

2.4 Data Uncertainties

The data collected for this report is not without uncertainties and limitations. Uncertainties and limitations associated with the data have been outlined below:

- *Three issues are associated with the uncertainty of when (dates) sites transition into and out of LTS.* The first issue involves the confusion as to what basis should be used when declaring a LTS start date. Some sites declared LTS start date when the cleanup activities at the site were completed. However, there are sites where cleanup activities at some portions of the site are expected to end several years before other portions of the site. In reverse the same issue applies to transitioning out of LTS. It is unknown, and therefore when transition out occurs, if sites will transition out of LTS as a "portion" or as a "site". Another issue with respect to the transition into LTS date is the effects of the declining environmental management budget. If budget limitations impact the agreed upon remedial scope, the schedule for transition into LTS may likely be delayed.

- *Estimated cost uncertainties have three drivers:* (1) scope used to form the cost estimate basis, (2) lack of contingency costs, and (3) the method of cost estimating. As stated, the various sites defined the scope of LTS differently. Thus, a cost estimate done at one site may be inconsistent with a cost estimate done at another site based on the different interpretation of LTS. The second driver of estimated cost uncertainties is the lack of contingency costs. A majority of the sites did not include contingencies in their LTS cost estimates reported in the NDAA. Given that most sites did not include contingencies in their LTS cost estimates, the current cost estimates represent very optimistic projections for the next decade and beyond. The third driver of cost estimate uncertainties is the method of cost estimating. Different sites based their estimates on different assumptions, which affect the accuracy of the overall cost projections for LTS.

- *Site end-states are a best guess.* For many sites a remedial action has not been selected. To state an end-state for these sites is premature. For sites that have a preferred remedial alternative, but that have not undergone remediation, there is an uncertainty in effectiveness of the remedy and thus the end-state. In addition, as environmental management budgets decline, the amount of money available for remediation decreases. Because of decreased budgets, potentially more residuals will be left which will impact the end-state.

- *Verification of data was not performed.* Data verification would require the sites to review the data for accuracy and completeness. This was not done because of restrictions on site contacts for data collection purposes.

- *Contaminant data was inconsistently reported.* For example, some sites reported just Cobalt where other sites would report which isotope of cobalt. In other instances sites would report VOC instead of specifically stating which VOC such as TCE.

- *Depth of data is limited.* Several sites have just begun remedial investigation and feasibility study phase of the CERCLA process. As a result the data necessary for this report does not exist. It should be noted that even those sites with more complete data; the data is just a "snapshot" in time when considering that several of the sites will require LTS activities into perpetuity.

- *The various sites defined the scope of LTS activities differently* and as a result the scope of LTS is inconsistent. The link between what should be considered LTS and what should be considered other activities becomes difficult to distinguish in some instances. For example, access restrictions to sites with ongoing defense missions may be driven by

national security issues rather than residual contamination at the site. Because these activities are not associated with residual contamination, these activities were not considered within the scope of LTS. Some sites did not clearly identify areas where LTS activities were occurring because remediation was taking place in other areas of the site. In other cases some sites considered groundwater treatment activities as a remediation activity where other sites considered groundwater treatment as a LTS activity.

3 DATA ROLLUPS

3.1 LTS Sites, Subsites, and Subportions

As noted earlier, 113 current and anticipated LTS sites, 211 subsites, and 921 subportions were identified and included in this report. Appendix B is a complete list of the sites and subsites. Note that there are basically two classes of sites. Some are large sites, which contain many subsites, but many other sites are small and contain only one subsite. As currently organized, there is wide variation in the size and complexity of subsites and their relation to their respective sites. The later definition of subportions has, to a great degree mitigated this granularity problem.

3.2 Initial LTS Activities and Completion

One item of great interest is the current and anticipated schedule for subsites to begin performing long term stewardship activities. Below are two graphs illustrating the complex-wide LTS schedule for subsites to initiate their long term stewardship activities. The first graph illustrates current and anticipated cumulative number of sites performing long-term stewardship activities.

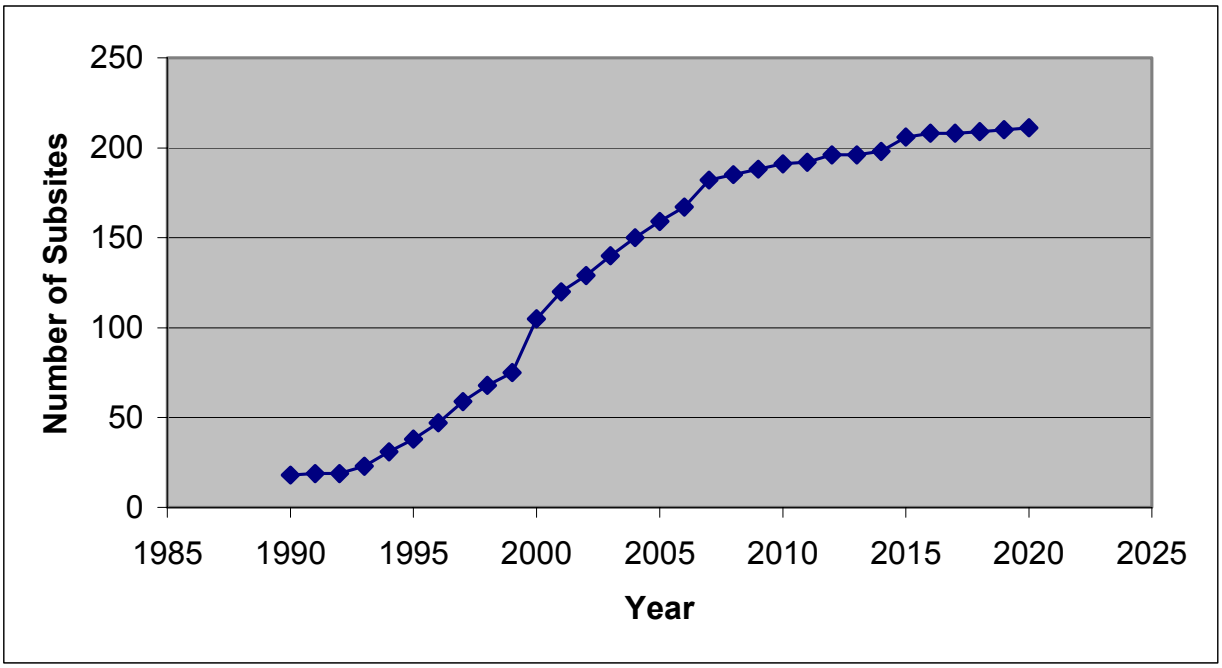


Figure 3-1. Cumulative LTS Activities Start Dates from 1999 to 2020.

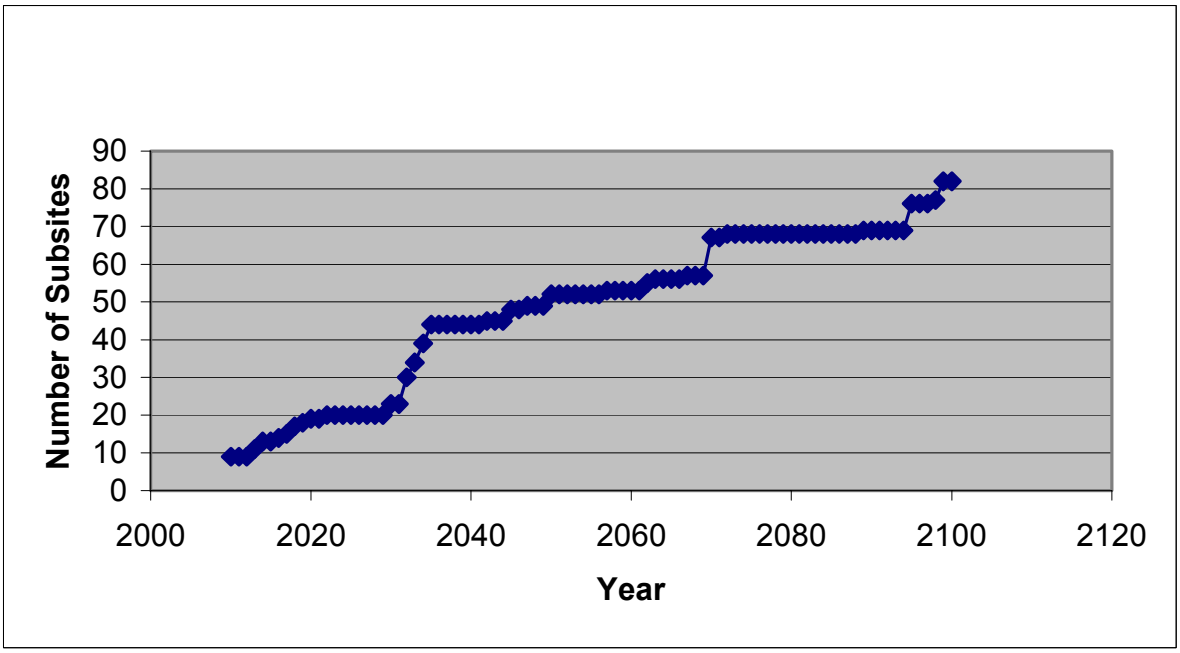


Figure 3-2. Anticipated Number of Subsites Having Completed Their Long Term Stewardship Commitments

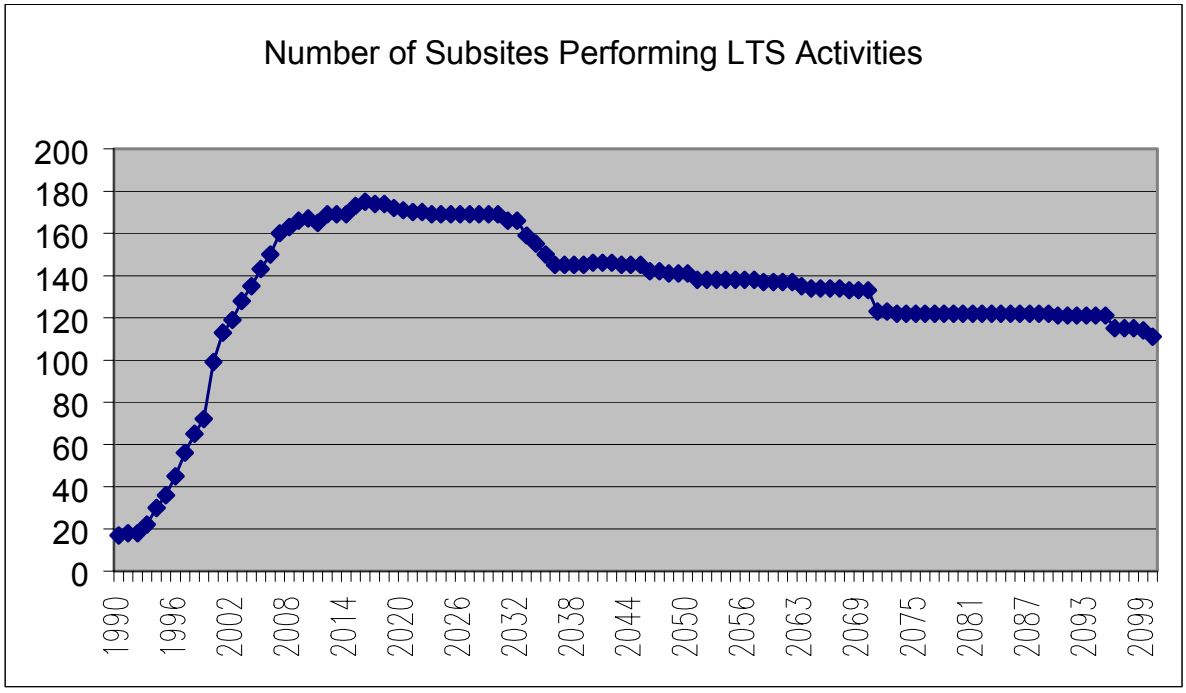


Figure 3-3. Anticipated Number of Subsites Conducting LTS Activities at any given time

3.3 Media and LTS Activity Distribution

Media types as defined in NDAA were classified into five categories. These are engineered unit, facility, groundwater, soil, and surface water/sediment. Figure 3-4 illustrates the

distribution of subportions over the six media types. Note soil, engineered unit, and groundwater compose the vast majority of the sites (843 of 921 or 92%).

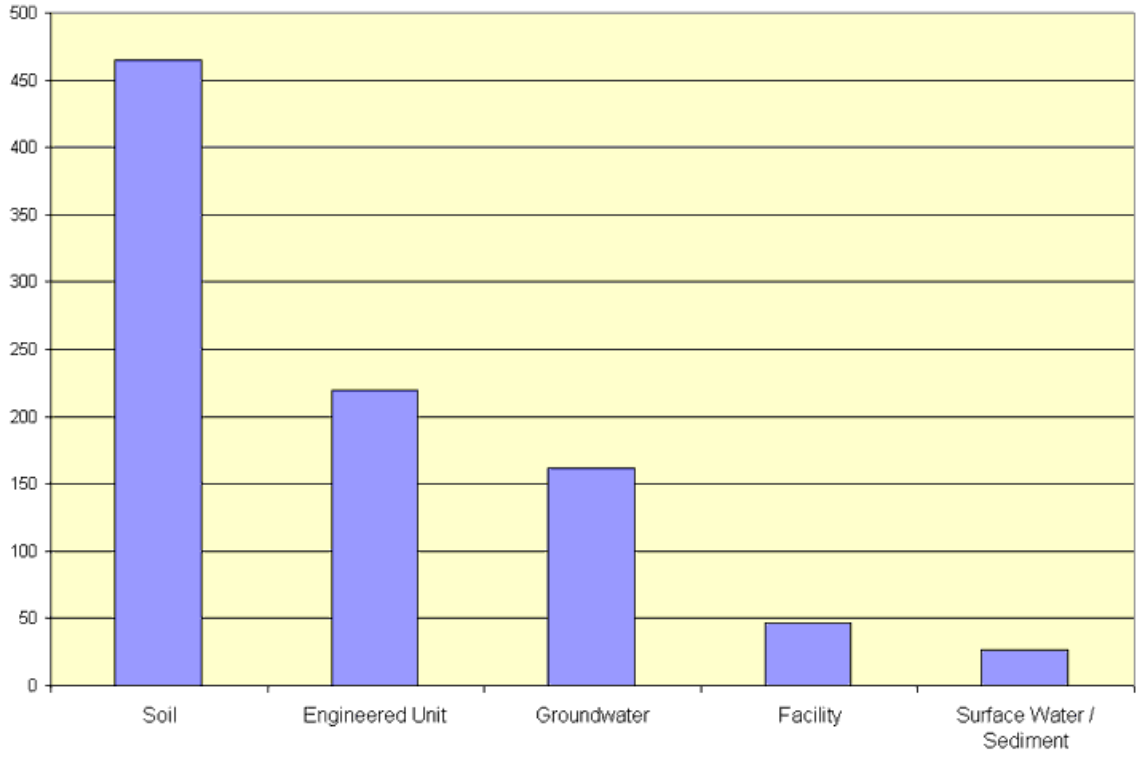


Figure 3-4. Media Distribution over LTS Subportions

Seventeen categories of remedial activities being performed at cleanup sites within the DOE complex were identified. Table 3-1 presents the number of subportions associated with each of these remedial activity categories.

Table 3-1. Number of Subportions within each Remedial Activity Category

Remediation Activity	No. of Subportions	Remediation Activity	No. of Subportions
Cap	203	D&D	13
Retrieve and Dispose	195	Groundwater Treatment	12
None	104	Other	12
Unknown	55	Soil Washing	10
Natural Attenuation	47	In-situ Remediation	8
Stabilization	41	Storage	3
Pump and Treat	39	In-situ Thermal Treatment	2
Selective Retrieval	34	Thermal Desorption	2
Vapor Extraction	22	In-situ Electro	1
Bioremediation	19	Ion Exchange	1
Water Treatment	17	Retrieve and Dispose	1
Barriers	16		

NOTE: It is possible (and likely) that multiple remediation activities will take place simultaneously at any one subportion. Therefore, the sum of all the subportions above does not equal the total number of subportions identified earlier in the report. Also, it should be noted that the terms “unknown” and “none” are not synonymous.

Sixteen different stewardship activities associated with the 921 subportions were identified. Figure 3-5 below presents the nine activities that were found to be most common among the subportions. Note that more than one LTS activity can occur at a given subportion. For a complete listing of all the stewardship functions, please see Appendix D.

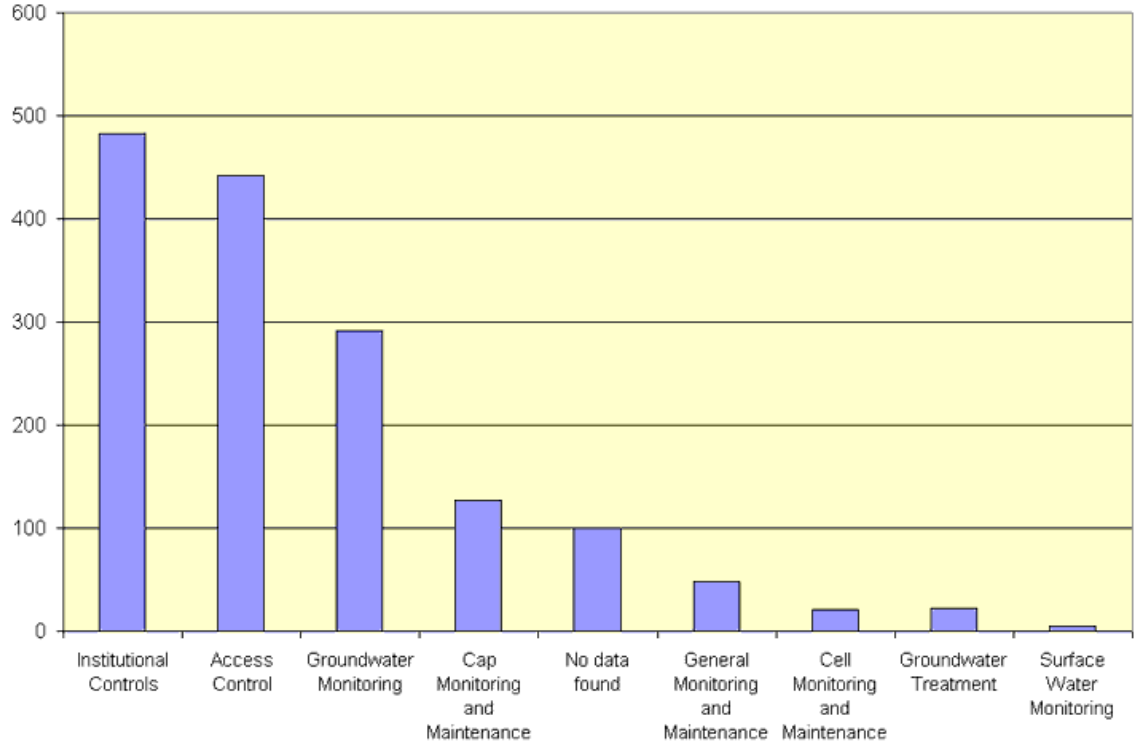


Figure 3-5. Number of Subportions Associated with most common LTS Activities

For additional information, please see Appendices C, D and E. Appendix C presents an integrated list of media and remediation activities. Appendix D presents stewardship activities and lists the number of associated subportions with each activity.

3.4 Top LTS Contaminants

A review of the sites that are currently or are anticipated to be under stewardship resulted in a list of 261 contaminants and contaminant categories (some contaminant information was only available in category form). These are listed along with the number of subportions associated with each in Appendix E. The top 24 contaminants and their associated number of sites are presented below in Figure 3-6.

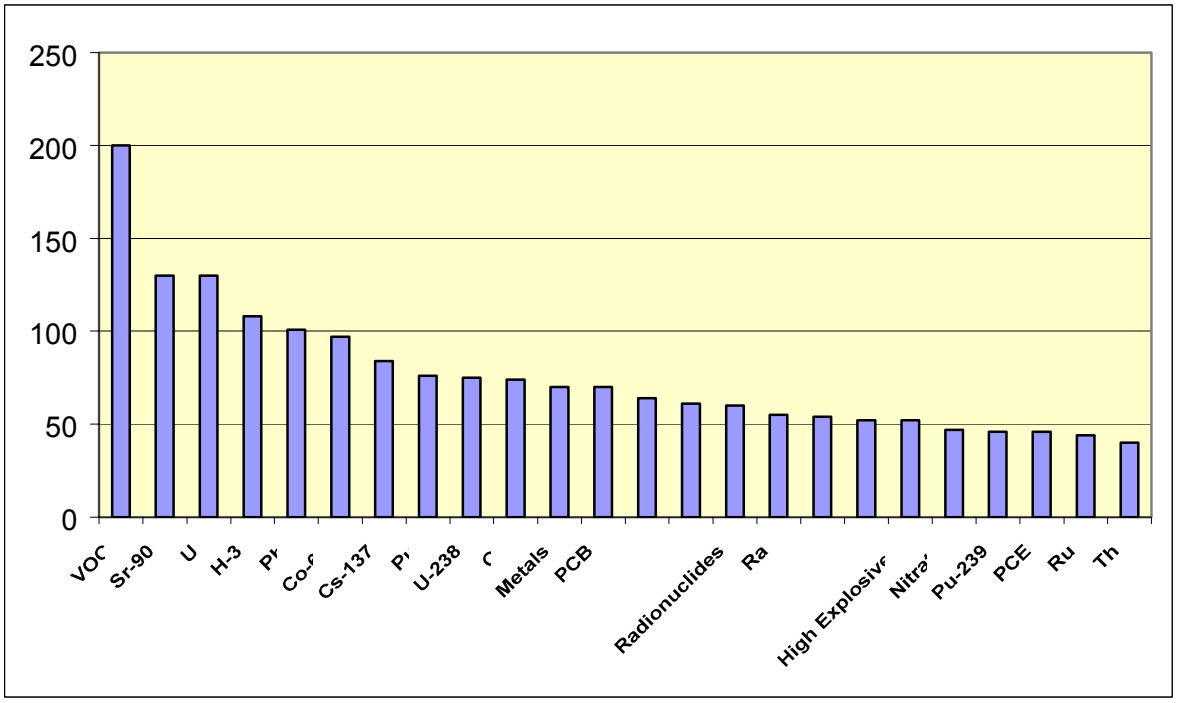


Figure 3-6. Top 24 Contaminants for Current and Anticipated LTS Subportions

Note: The contaminants in Figure 3-5, above, are listed as they were reported by the respective sites and need to be standardized for consistency. For example, 80 subportions reported Pu, without reference to a specific isotope. This is in addition to 49 subportions reporting Pu-239.

The following graphs illustrate the distribution of subportions by top contaminants and by LTS media types, engineered units, facilities, groundwater, and soil.
This information may be valuable to anyone attempting to evaluate the relative importance that any one group of contaminants may have, as related to the performance of LTS activities.

3.4.1 Engineered Structures

From all the subportions reported, 220 fall under the category of engineered units and the contaminants most frequently found in these are listed in Figure 3-7, below.

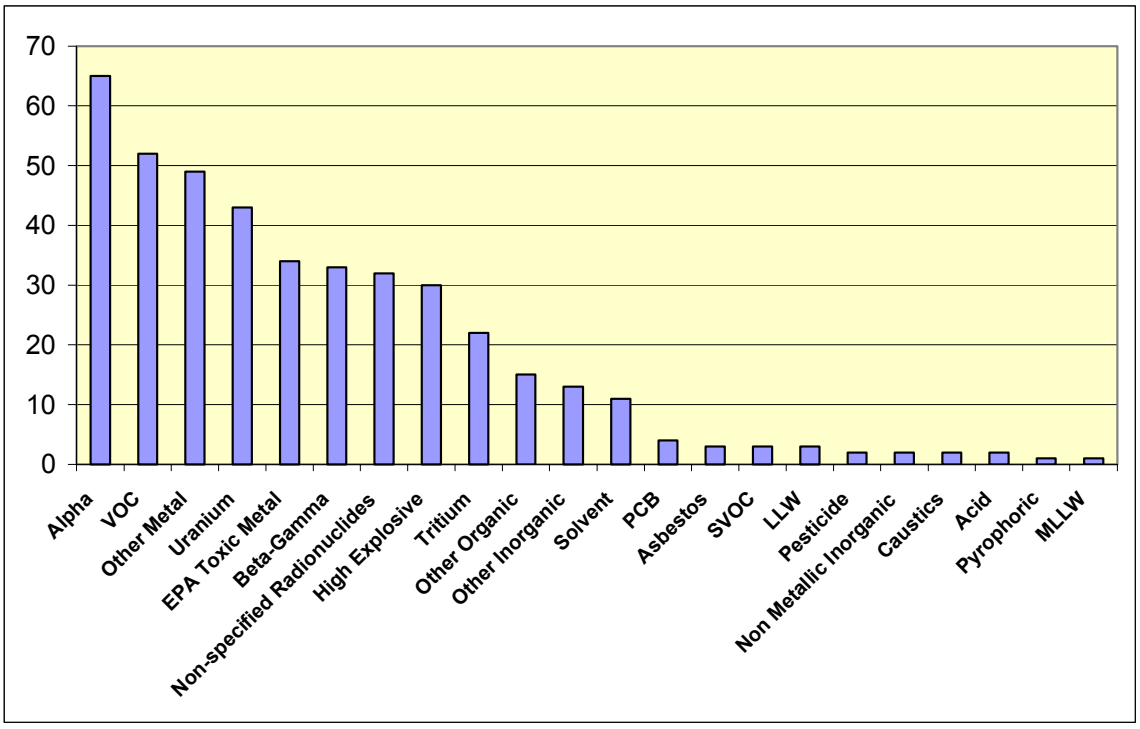


Figure 3-7. Top Contaminants in Engineered Structure Subportions

3.4.2 Facilities

From all the subportions reported, 47 fall under the category of facilities and the contaminants most frequently found in these are listed in Figure 3-8, below.

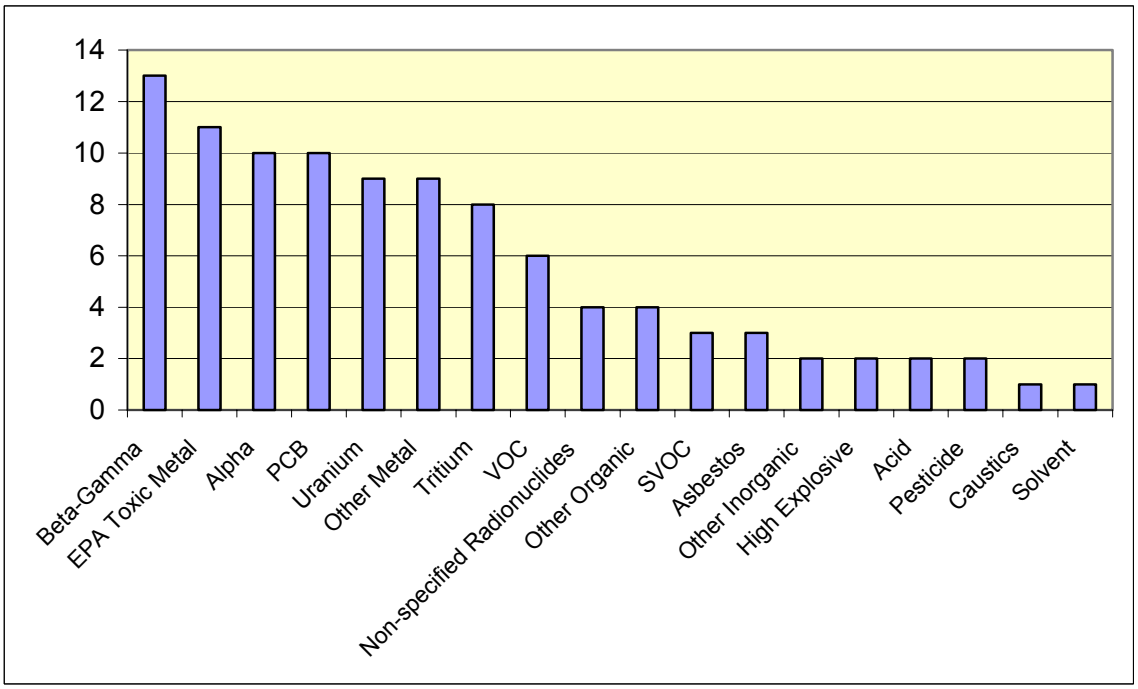


Figure 3-8. Top Contaminants in Facility Subportions

3.4.3 Groundwater

From all the subportions reported, 162 fall under the category of groundwater and the contaminants most frequently found in these are listed in Figure 3-9, below.

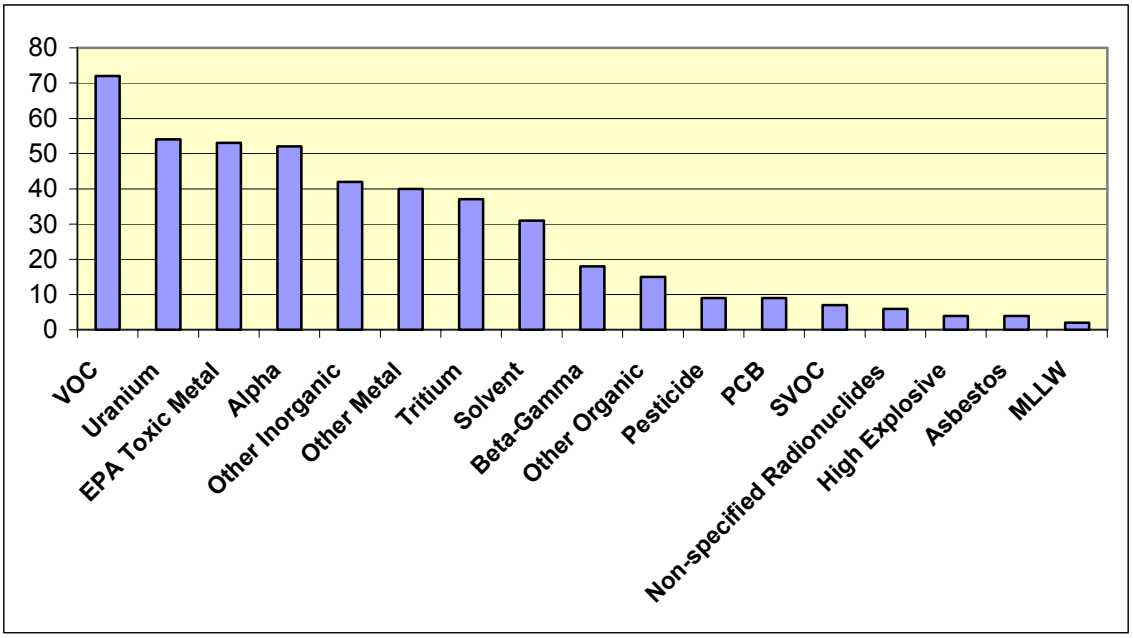


Figure 3-9. Top Contaminants in Groundwater Subportions

3.4.4 Soils

From all the subportions reported, 465 fall under the category of soils and the contaminants most frequently found in these are listed in Figure 3-10, below.

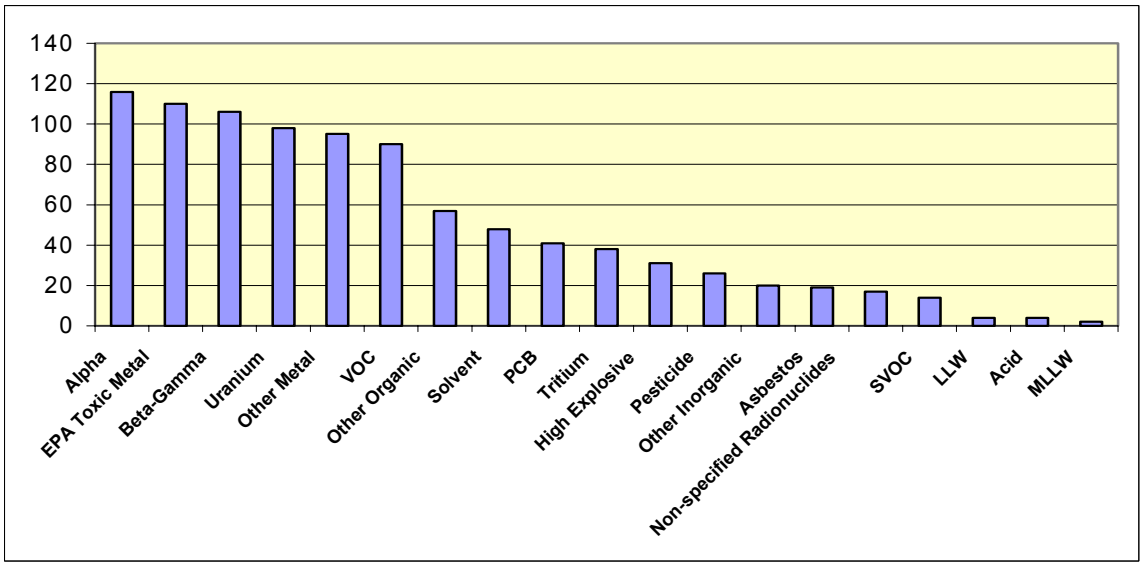


Figure 3-10. Top Contaminants in Soils Subportions

4 SCENARIOS

For the purposes of this report, a "scenario" is defined as a situation involving certain site characteristics and the corresponding LTS activities being performed. The set of site characteristics (physical, chemical and general conditions) is defined as an "end-state". This is equivalent to the "end-point" of the remediation activities before LTS activities began.

The concept of scenarios was developed as the projected LTS activities became clearer. Evaluating the benefits that a new technology or technique might bring to the sites under LTS requires the data to be organized in a way that quickly identifies what sites are likely candidates for the deployment of such technology. Furthermore, the volume of medium with the specific contaminants of interest, stakeholders and the typical climate, for example, might be of importance to accurately perform such an evaluation.

The following charts depict what some end-states and scenarios defined at this time, to illustrate the type query and resulting information that may be required to allow the LTS National Program to make decisions pertinent to the operations of the program.

An End-State is defined as "the set of physical and chemical characteristics and conditions in which a site (or subsite) is transferred to the LTS National Program". Figure 4-1 represents some of the end-states commonly found at current of future LTS sites

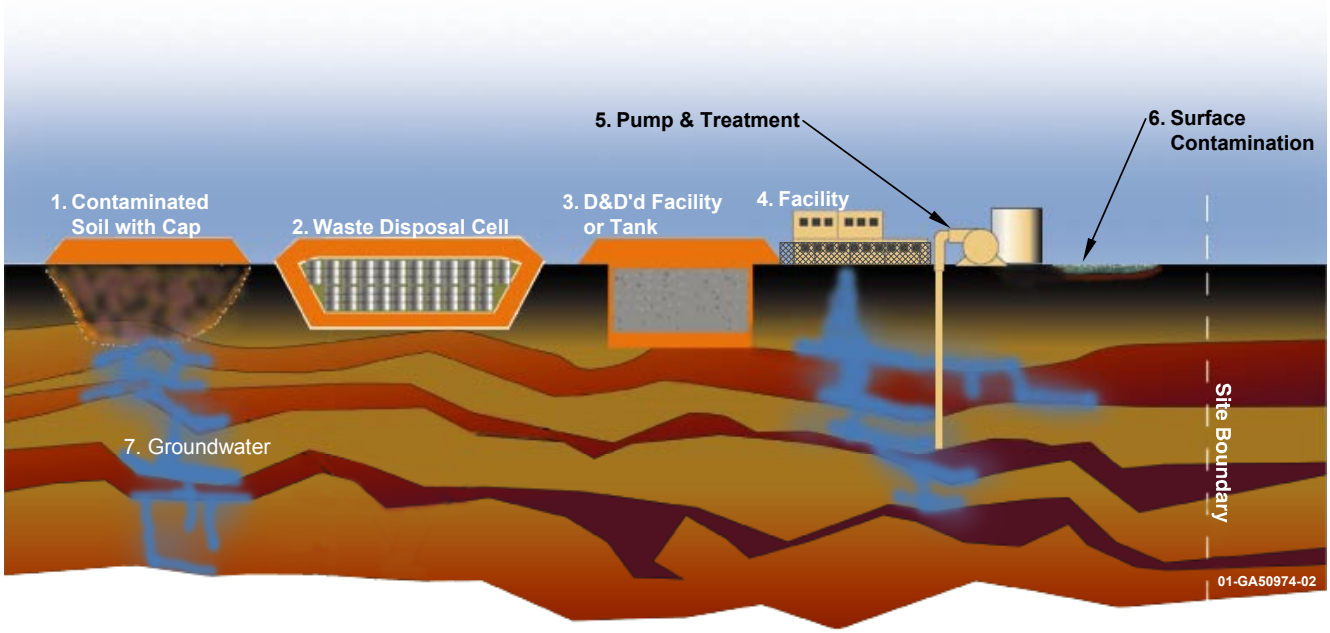
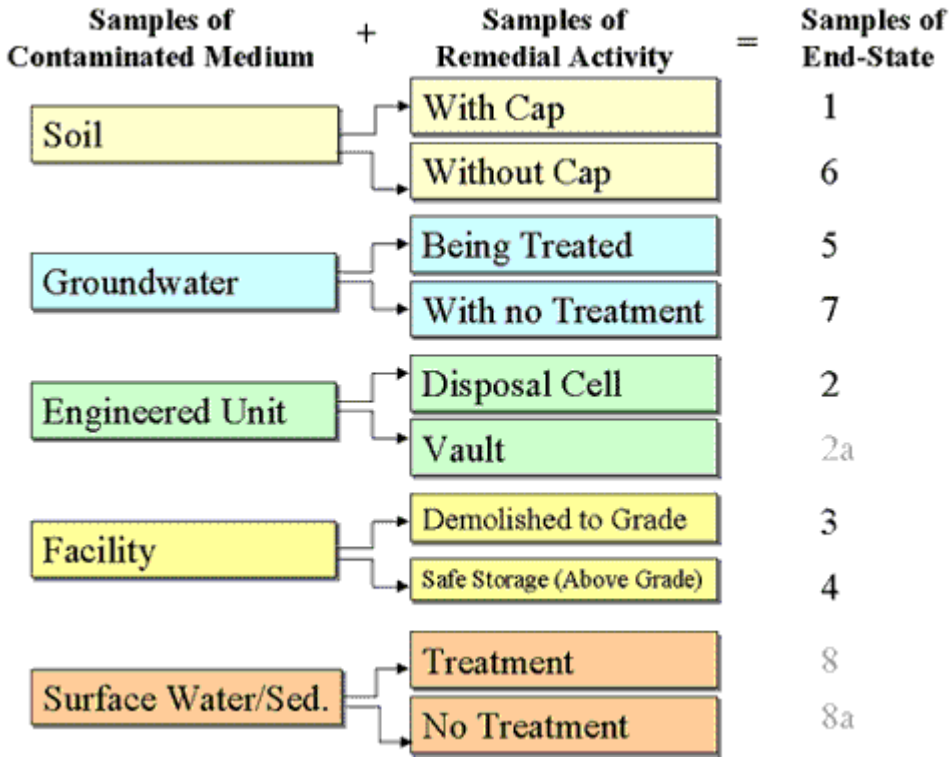


Figure 4-1. Examples of End-States

From Figure 4-1, the following end-states are listed:



(*) Note: Due to low frequency for these end-states, they are not depicted in figure 13

Figure 4-2. Examples of End-States

End-states 1 and 7 are used to develop credible scenarios as follows:

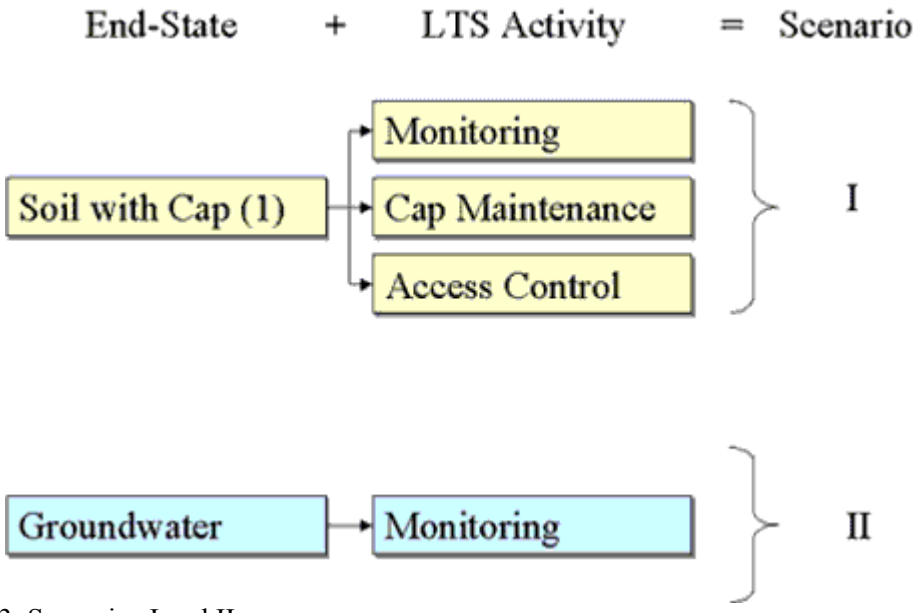


Figure 4-3. Scenarios I and II

As scenario I develops, it will produce data such as monitoring readings, sampling results, unit costs of operations, etc., and these data may be stored in the information management system. A set of queries performed by the Decision Analysis Group will likely produce information that will help assess if the number of cases fitting the above scenario, their location and other common characteristics warrant any intervention, or a need to change any of the LTS operations.

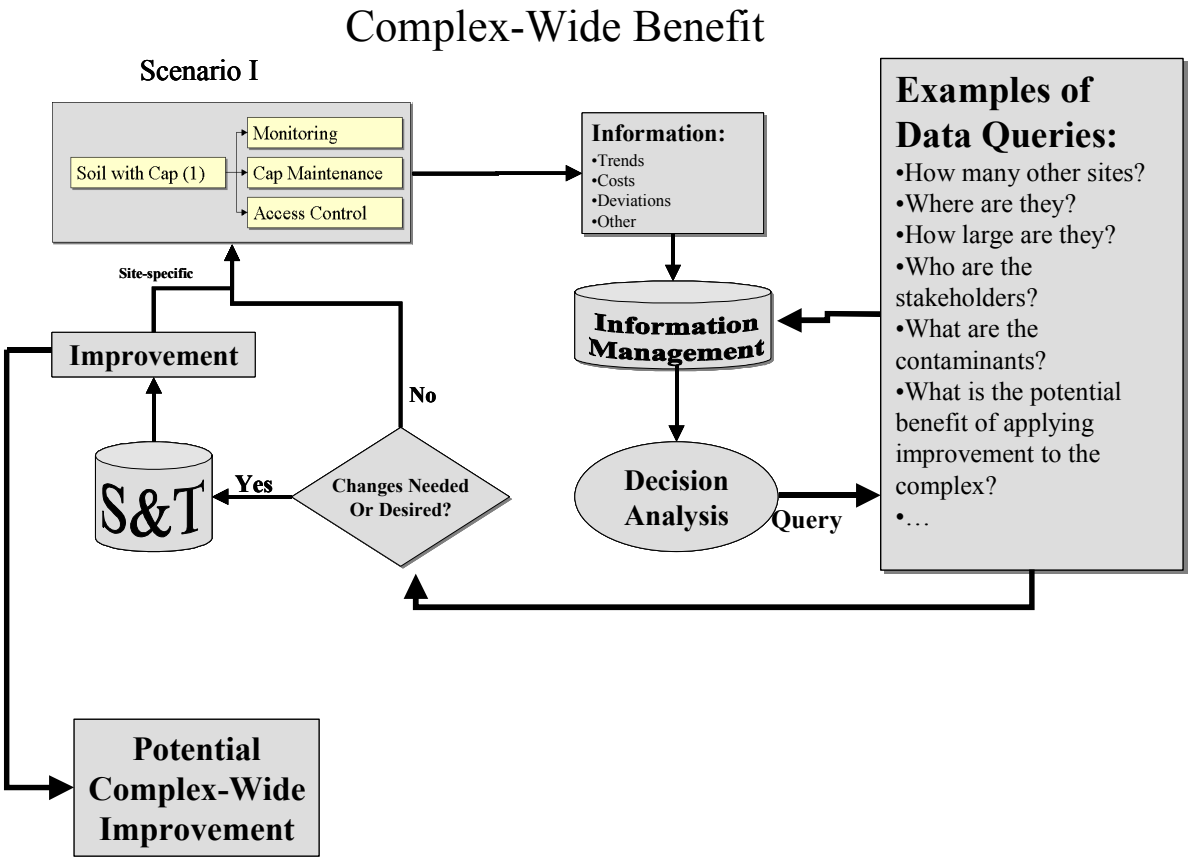


Figure 4-4. Utilization of Technical Baseline Data

Figures 4-5 and 4-6 present two examples of the numerous scenarios that can be presented. The intent of this section is to illustrate how an apparently isolated case of inadequate behavior of the containment mechanism for any given site/subsite/subportion, could indicate a trend worthy of a complex-wide evaluation. The type of questions reflected in the first scenario could be repeated for all the other examples, regardless of the failure mode itself. There will be a need to identify the number of sites in a similar condition, the location, the contaminants, the stakeholders, regulations, etc.

The ability to query the data according to the need is a significant advantage of the way the LTS program has decided to keep data. Although the data as it currently exist may not satisfy all of the above requirements, it is the goal of the LTS National Program to get to a position of knowledge to be able to address the above scenario fully. This data V&V activity is scheduled to take place during FY02.

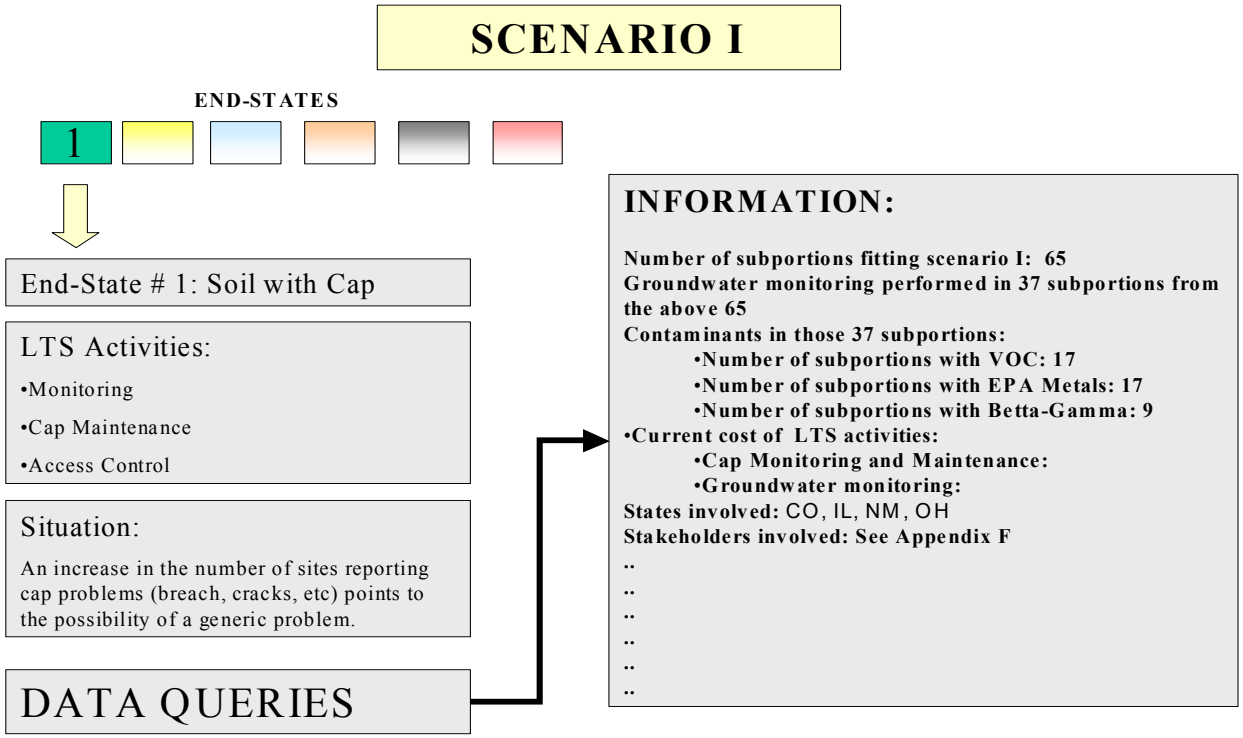


Figure 4-5. Sample Scenario of End State #1 – Soil with Cap

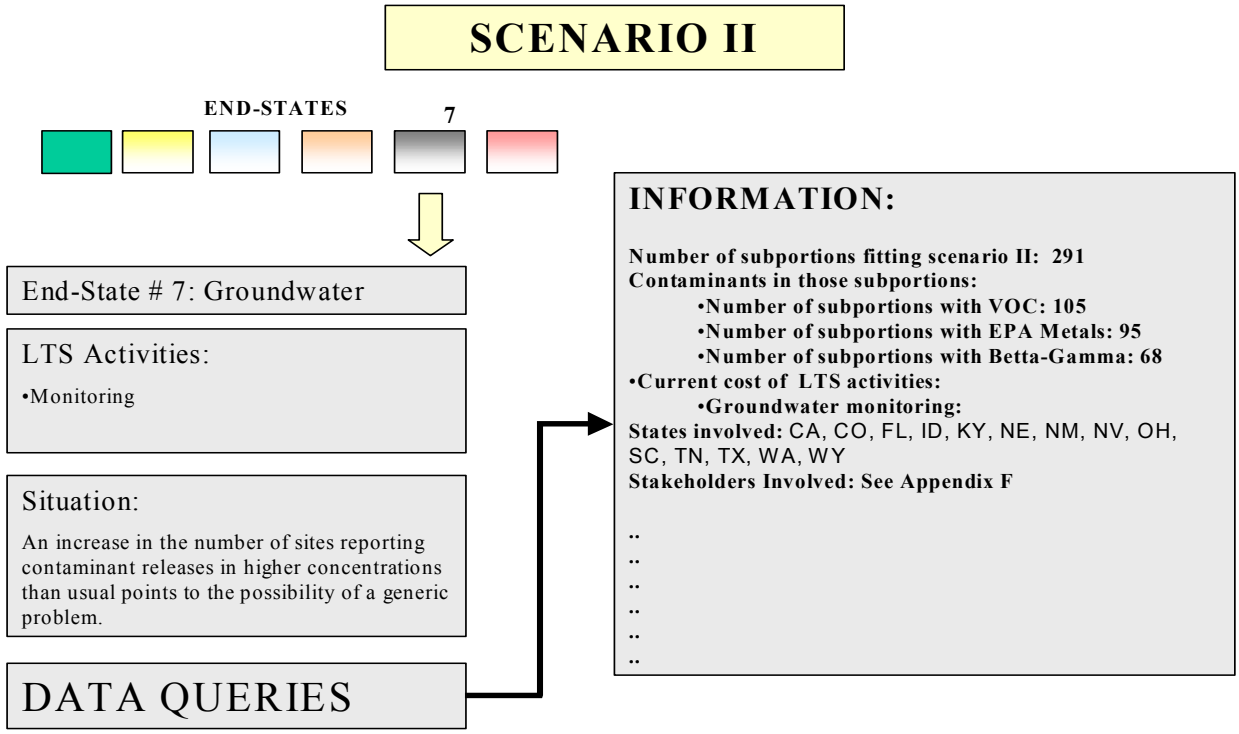


Figure 4-6. Sample Scenario of End State #7 – Groundwater with No Treatment

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5 CASE STUDIES

The diversity among the sites, or portions within those sites, which will eventually come under the care of the NLTS program, is due primarily to the original mission of those sites. For example, a complex site with multiple activities like SRS or the INEEL could have a wide variety of physical, chemical and radiological hazards to guard against, whereas an UMTRCA site like Tuba City may have a fairly limited number of contaminants, as well as a single disposal cell, regardless of the volumes involved.

This report attempts to capture this variety in complexity and scope by examining a number of sites, and their subsites, from a Long Term Stewardship perspective. The granularity of the information required to perform LTS activities on these sites will vary from site to site. However, the type of information seems to be consistent regardless of its complexity. All analyses to be performed in the future will require every site's geographic location, climate, demographics in the State or region, future use of the land, the degree of involvement of stakeholders, etc.

The following sites were chosen as "case studies" to illustrate the differences mentioned above and the challenges they might imply in the performance of the LTS activities described in the "Functional Decomposition" in Section 2. For each of the sites listed below, two sets of case study information are provided: 1) Site, and 2) Subportions specific for the site. The case studies are:

- *Idaho National Engineering and Environmental Laboratory.* A complex site in an arid and rural environment with a current mission, a great deal of variety in prior missions and therefore, a legacy of very different end-states.

- *Mound.* A closure site, where one of its portions has already been released (with restrictions) to a community-based redevelopment corporation, and another portion of the site is undergoing remediation activities.

- *Nevada Test Site.* A "detonation" site, characteristic of nuclear testing.

- *Weldon Springs.* A closure site with a history of multiple owners, missions and contaminants, along with its topographic location (flood plain) and proximity to a densely populated area makes this site a like candidate for complex LTS activities.

- *Fernald.* A closure site with a long history of nuclear materials manufacturing, which has completed its mission and is waiting to enter the LTS National Program.

- *Savannah River Site.* A complex site in a humid and moderately populated environment with a current mission, a great deal of variety in prior missions and therefore, a legacy of very different end-states.

Site Name: Idaho National Engineering and Environmental Laboratory

Site Description:

The Idaho National Engineering and Environmental Laboratory (INEEL) has been a center of nuclear technology for over half a century supporting Naval nuclear propulsion and civilian and military nuclear applications. The site occupies 230,321 hectares (569,135 acres) in southeast Idaho, approximately 40 kilometers (25 miles) west of Idaho Falls. The site consists of nine primary facility areas situated on an expanse of otherwise undeveloped, high-desert terrain. Buildings and structures at the INEEL are clustered within these primary facility areas, which are typically less than a few square miles in size and separated from each other by miles of primarily undeveloped land.

State: Idaho

PSO: DOE
Field Office: ID

Climate: Arid

Pop. density: L

Stakeholders:

- Local Businesses, education, and citizen organizations
- The Idaho Depts. of Transportation & Fish and Game
- U.S. Park Service
- U.S. Bureau of Land Management
- Shoshone-Bannock Tribes
- State of Idaho
- U.S. Forest Service

Subsites:

Name	LTS Start	LTS Finish
Auxiliary Reactor Area	1996	2095
BWR Experiment Area	1997	2316
Central Facilities Area	1996	2099
EBR-1	1964	2095
INTEC Sites	2008	2095
Ordinance Area	1993	2095
Power Burst Facility Soils	1996	2095
SLPR-1 Burial Ground	1997	2396
Test Area North	2003	2099
Test Reactor Area	2000	2099

LONG-TERM STEWARDSHIP HIGHLIGHTS

Major Long-Term Stewardship Activities –monitoring and maintaining engineered units; enforcing institutional controls; restricting access

Total Site Area - 230,321 hectares (569,135 acres)

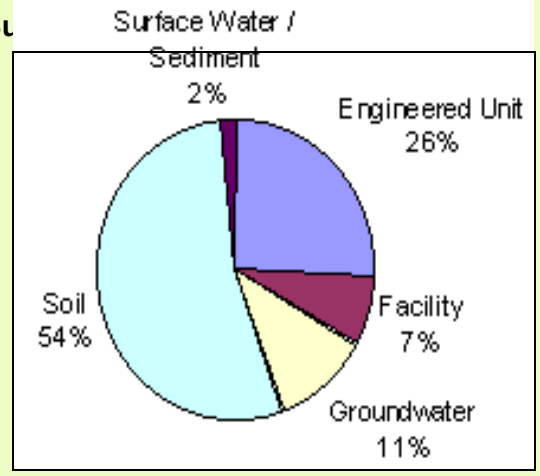
Estimated Volume of Residual Contaminants – soil 8.2 million m^2 (11 million cubic yards); groundwater 18 billion m^2 (23 billion cubic yards); engineered units 53,600 cubic meters (70,100 cubic yards); facilities 8,000-69,000 m^2 (10,000-90,000 cubic yards)

Subportions Requiring Long-Term Stewardship as of 2006 - 16

Site Name: INEEL Subportion Information

Number Of Subportions: 48

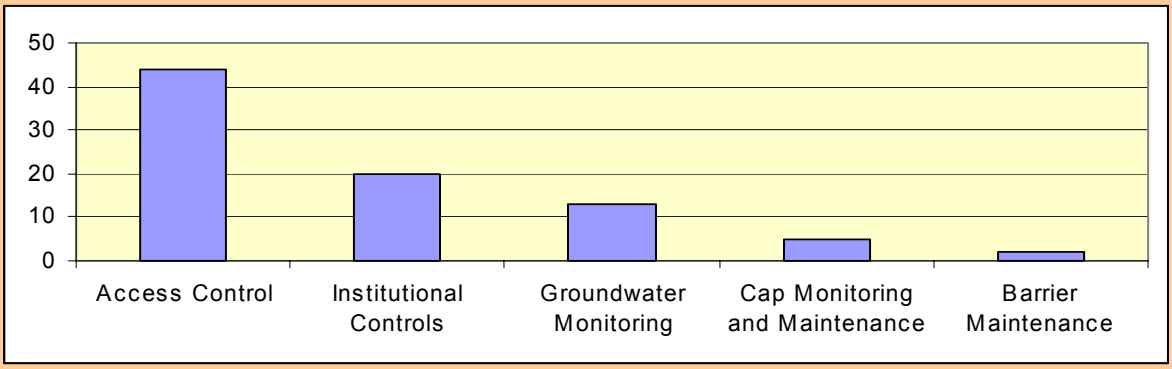
Su



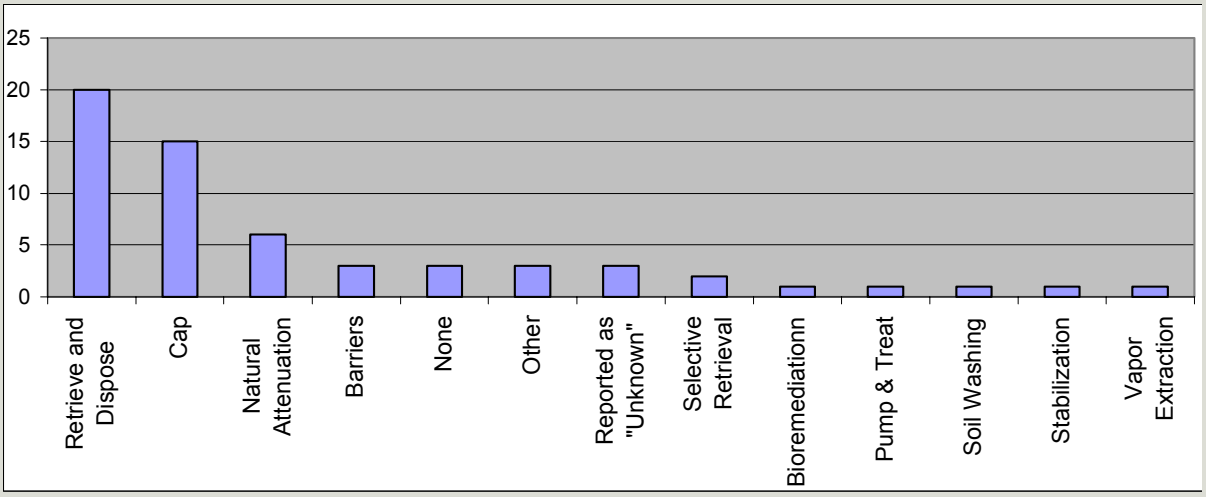
Subportion Distribution by Volume:

Media	Volume (in m3 x 1000)
Engineered Structure	53
Facility	69
Groundwater	18000000
Soil	8200
Surface Water/Sediment	0

Subportion Distribution by LTS Activity



Subportion Distribution by Remedial Activity



Site Name: Mound – Miamisburg Environmental Management Project

Site Description:

The U.S. Department of Energy's (DOE) Miamisburg Environmental Management Project (MEMP, formerly known as the Mound Plant) is located in Miamisburg, Ohio, approximately 16 kilometers (ten miles) southwest of Dayton. Most of the 124-hectare (306-acre) site overlooks the city from a ridge that extends toward downtown Miamisburg from the southern city limits. Mound Road, on the east side of the plant, is lined by residences and provides access to the plant's main gate. A Conrail freight line runs along MEMP's western border, and the old Miami-Erie Canal bed runs west of the track. Approximately half a mile farther west from the MEMP is the Great Miami River.

In 1946, DOE built the Mound Plant to develop and fabricate nuclear and non-nuclear components for the weapons program. In the 1950s, the MEMP began building detonators, cable assemblies, and other non-nuclear weapons components and products. In 1969, the plant's mission expanded to include retrieving and recycling tritium from dismantled nuclear weapons. In addition, MEMP mission involved the production of components that contained plutonium-238, polonium-210, tritium, and explosives.

State: OH

PSO: EM
Field Office: OH

Climate: Humid

Population density: M

Stakeholders:

- Miamisburg Environmental, Safety, and Health Group
- Mound Action Committee
- Mound Reuse Committee
- Miamisburg Mound Community Improvement Corporation
- City of Miamisburg, Ohio

Subsites:

Name	LTS Start	LTS Finish
Site-wide	2007	9999

LONG TERM SEWARSHIP HIGHLIGHTS

Major Long-Term Stewardship Activities - monitoring; institutional controls

Total Site Area - 124 hectares (306 acres)

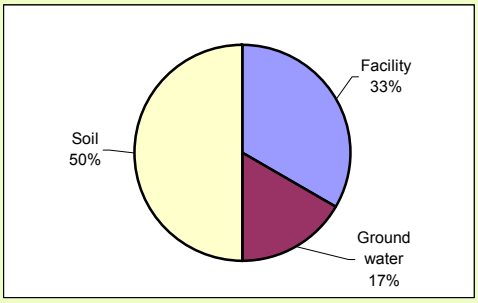
Estimated Volume of Residual Contaminants -
Unknown

Long-Term Stewardship Start-End Years - 2007-in perpetuity

Site Name: Mound – Subportion Information

Number Of Subportions: 6

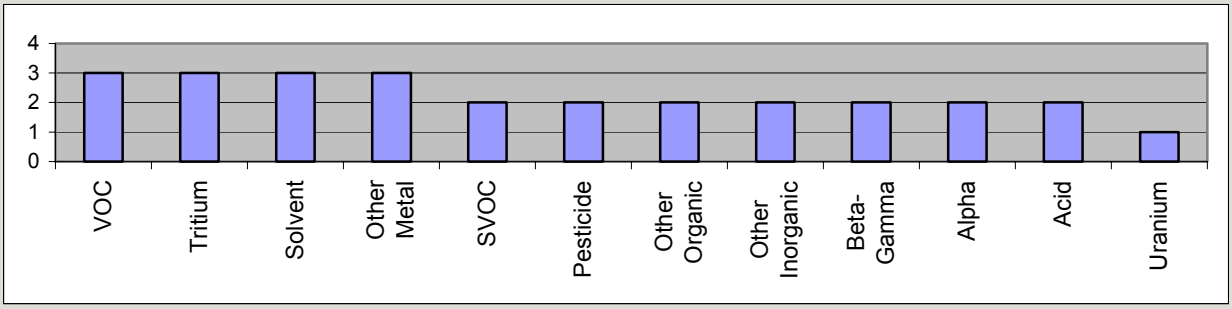
Subportion Distribution by Media Type:



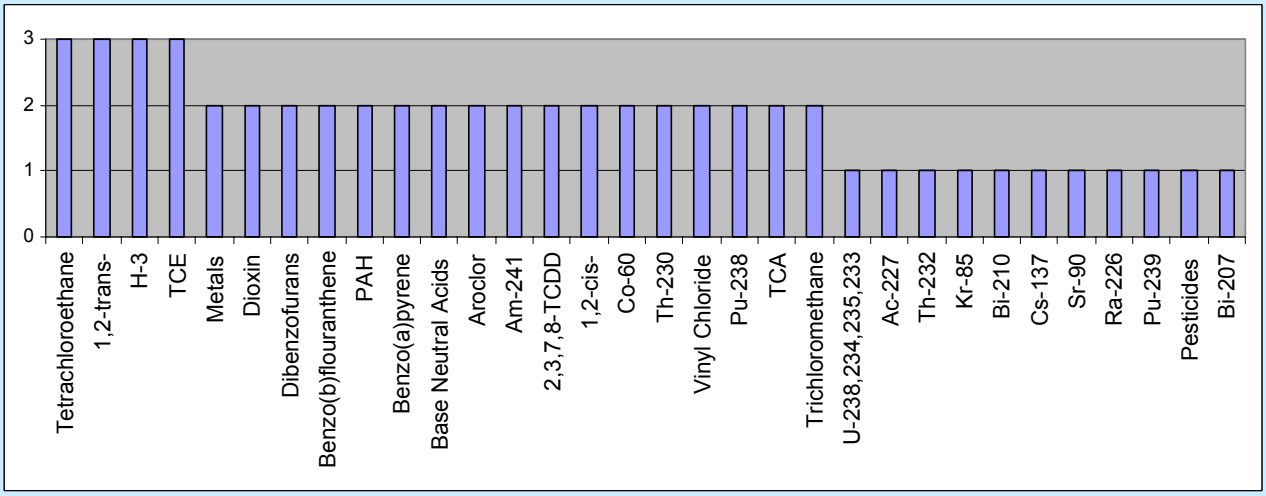
Subportion Distribution by Remediation Activity and Media

Media	Remediation Activity	Count Of Subportion
Facility	D&D	1
Facility	Retrieve and Dispose	1
Groundwater	Vapor Extraction	1
Soil	None	1
Soil	Retrieve and Dispose	1
Soil	Vapor Extraction	1

Subportion Distribution by Contaminant Class



Subportion Distribution by Contaminant (top 25)



Site Name: Nevada Test Site

Site Description:

The Nevada Test Site, operated by the U.S. Department of Energy (DOE), is located approximately 104 kilometers (65 miles) northwest of Las Vegas, Nevada, in a sparsely populated region about the size of the State of Rhode Island. The site encompasses 3,561 square kilometers (approximately 1,375 square miles) of desert and mountainous terrain and is surrounded on three sides by the Nellis Air Force Range, which provides a substantial buffer between the site and public lands. The Tonopah Test Range, an Air Force munitions range and research and development site, is located north of the Nevada Test Site approximately 240 kilometers (150 miles) northwest of Las Vegas, Nevada. The Tonopah Test Range comprises 1,616 square kilometers (624 square miles) and is also surrounded on three sides by the Nellis Air Force Range and to the north by Bureau of Land Management open range.

State: NV

PSO: DP
Field Office: NV

Climate: Arid

Population density: L

Stakeholders:

- Community Advisory Board
- U. S. Department of Agriculture
- Public
- Consolidated Group of Tribes and Organizations
- Native American Graves Protection
- State of Nevada

Subsites:

Name	LTS Start	LTS Finish
Area 3 Radioactive Waste Management	2016	2045
Area 5 Radioactive Waste Management	2016	2045
Industrial Sites	2010	2014
Soil Sites	2009	2016
Underground Test Area	2018	2117

LONG TERM SEWARSHIP HIGHLIGHTS

Major Long-Term Stewardship Activities – maintain site-wide institutional controls; conduct surveillance and monitoring around waste disposal areas; monitor groundwater flow from underground test areas

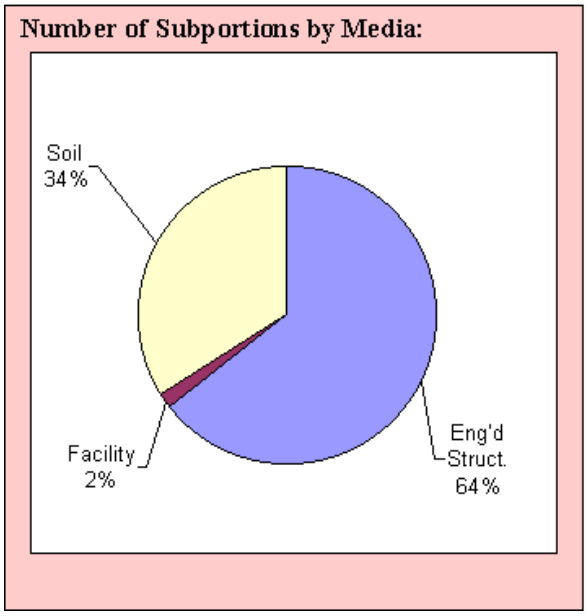
Total Site Area - 517,739 hectares (1,279,360 acres)

Estimated Volume of Residual Contaminants - to be determined

Portions Requiring Long-Term Stewardship as of 2006 - perpetuity

Site Name: Nevada Test Site Subportion Information

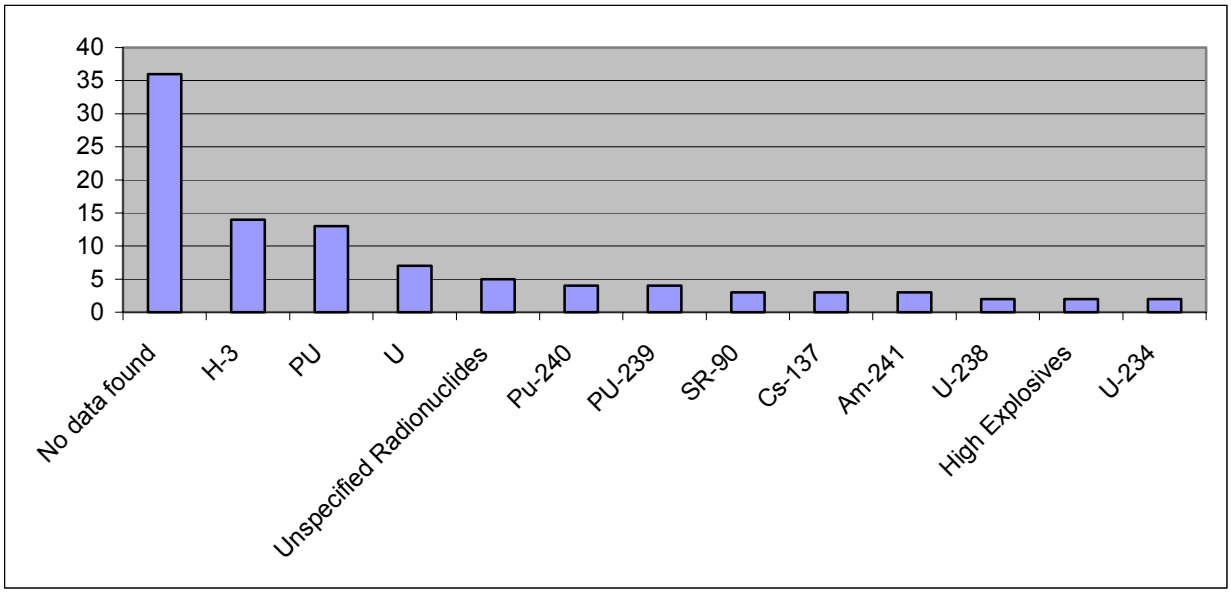
Number Of Subportions: 59



Subportion Distribution by Remediation Activity and Media

Media	Remediation Activity	Count Of Subportion
Engineered Structure	Cap	11
Engineered Structure	Other	1
Engineered Structure	Unknown	26
Facility	Unknown	1
Soil	Bioremediation	1
Soil	None	5
Soil	Retrieve and Dispose	9
Soil	Unknown	7

DISTRIBUTION OF SUBPORTIONS BY CONTAMINANTS



Site Name: Weldon Spring

SiteDescription:

The Weldon Spring Site is located in southern St. Charles County, Missouri, approximately 48.2 kilometers (30 miles) west of St. Louis along Missouri State Route 94. The site consists of two main areas, the Weldon Spring Chemical Plant and the Weldon Spring Quarry.

The Weldon Spring Chemical Plant Site is an 87.8- hectare (217-acre) area initially used by the U.S. Army during the 1940s to produce the explosives trinitrotoluene (TNT) and dinitrotoluene (DNT), and later by the U.S. Atomic Energy Commission (AEC) [a predecessor agency to the U.S. Department of Energy (DOE)] to process uranium and thorium ore concentrates. Site features included 40 buildings, four raffinate pits, two ponds, and two former dump areas. Mallinckrodt Chemical Company operated the plant from 1957 until it was shut down in 1966.

State: MO

PSO: EM
Field Office:

Climate: H

Pop. density: M

Stakeholders:

- Weldon Spring Citizens

Subsites:

Name	LTS Start	LTS Finish
Chemical Plant	2003	9999
Quarry Groundwater	2003	9999

LONG-TERM STEWARDSHIP HIGHLIGHTS

Major Long-Term Stewardship Activities – surface water and groundwater monitoring; disposal cell maintenance and monitoring; institutional controls; inspections.

Total Site Area - 91.4 hectares (226 acres)

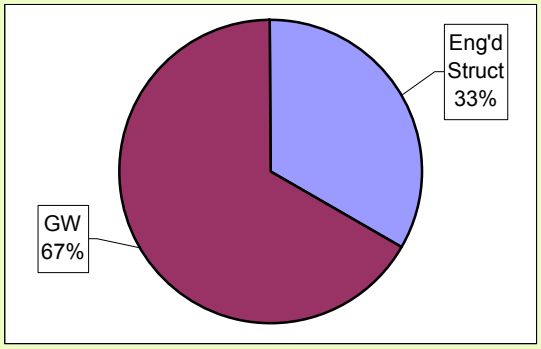
Estimated Volume of Residual Contaminants - engineered unit 1.13 million cubic meters (1.48 million cubic yards); groundwater 85,000 cubic meters (110,000 cubic yards)

Long-Term Stewardship Start-End Years - 2003-in perpetuity.

Site Name: Weldon Spring Subportion Information

Number Of Subportions: 6

Subportion Distribution by Media Type:



Subportion Distribution by Media Volume:

Media	Volume (m3)
Engineered Structure	1.13 Million
GW	85,000

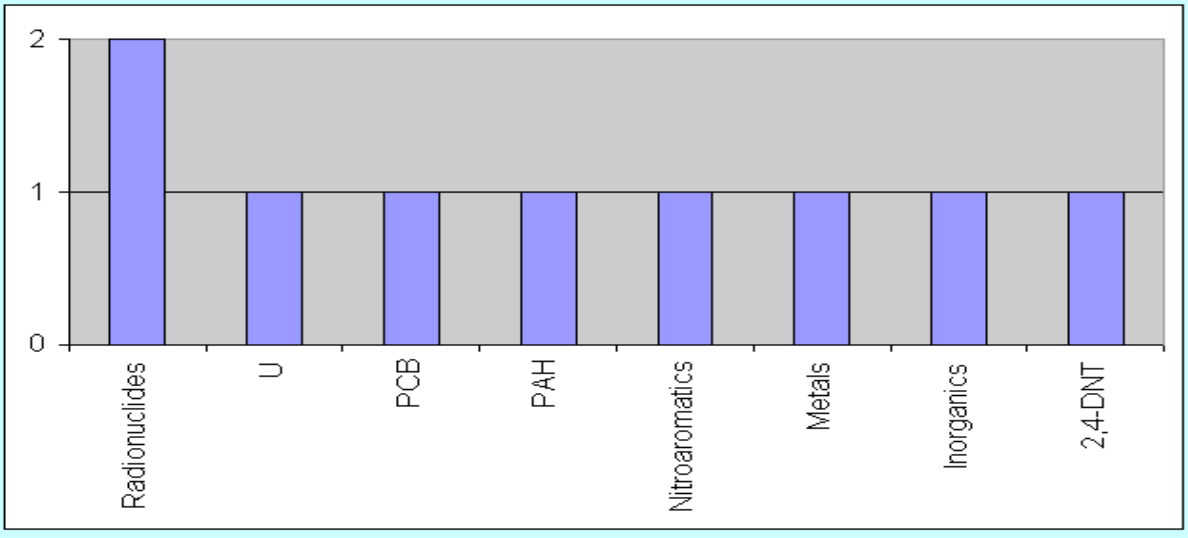
Subportion Distribution by LTS Activity

All three subportions: Institutional controls and ground water monitoring.

Subportion Distribution by Remediation Activity and Media

Media	Remediation Activity	Number Subportions
Engineered Structure	Cap	1
Groundwater	Barriers	1
Groundwater	Natural Attenuation	1

Subportion Distribution by Contaminant Class



Site Name: Fernald

Site description:

The U.S. Department of Energy's (DOE) Fernald Environmental Management Project (FEMP) is the site of the former uranium metal production plant (the Fernald plant), which supplied high-purity uranium products to the DOE (and predecessor agency) nuclear weapons complex. FEMP is located in a rural area on a 420-hectare (1,050-acre) tract of land overlapping the boundary between Hamilton and Butler Counties near the southwest corner of Ohio. The site is located approximately 27 kilometers (17 miles) northwest of Cincinnati. The Great Miami River flows in a southerly direction, approximately 1.6 kilometers (1 mile) east of the site. Paddy's Run, a small stream, runs southward along the western boundary of the site. FEMP is physically located over the Great Miami Aquifer.

State: OH

PSO: EM
Field Office: OH

Climate: H

Pop. density: M

Stakeholders:

- Fernald Residents for Environmental Safety and Health
- Fernald Citizens Advisory Board
- District Chief for the Ohio EPA
- Long-Term Stewardship Committee
- State of Ohio

Subsites:

Name	LTS Start	LTS Finish
Site-wide	2007	9999

LONG-TERM STEWARDSHIP HIGHLIGHTS

Major Long-Term Stewardship Activities – access restrictions; institutional controls; engineered unit maintenance and monitoring

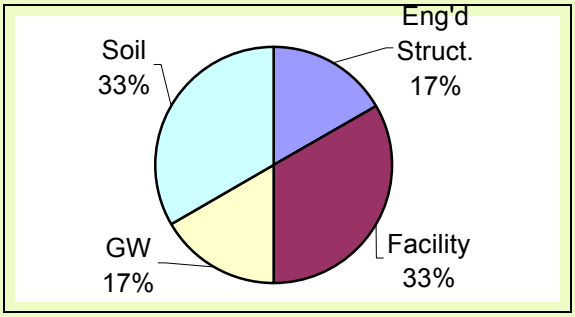
Total Site Area - 420 hectares (1,050 acres)

Estimated Volume of Residual Contaminants – disposal cell - up to 1.9 million cubic meters (2.5 million cubic yards)

Long-Term Stewardship Start-End Years - 2007-in perpetuity.

Site Name: Fernald

Subportion Distribution by Media Type:



Subportion Distribution by Media Volume:

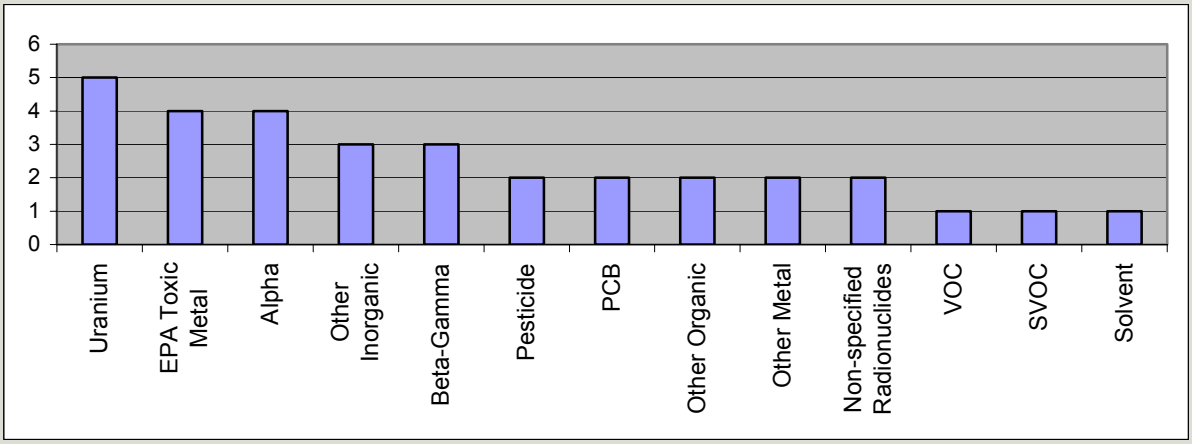
Media	Volume
Engineered Structure	1.9 Million m3

Subportion Distribution by LTS Activity: 100% Institutional Controls

Subportion Distribution by Remediation Activity and Media:

1.1.1 Media	Remediation Activity	Number of Subportions
Engineered Structure	Retrieve and Dispose	1
Facility	Other	1
Facility	Retrieve and Dispose	1
Soil	Retrieve and Dispose	2
Groundwater	Pump and Treat	1

Subportion Distribution by Contaminant Class



Site Name: Savannah River Site (SRS)

Site description:

The U.S. Department of Energy's Savannah River Site (SRS) produced plutonium and tritium for the nation's defense program from the early 1950s to the late 1980s. SRS now processes, recycles, and stores nuclear materials in support of national defense and nuclear nonproliferation efforts and develops and deploys technologies to improve the environment and treat nuclear and hazardous wastes left over from the Cold War.

The SRS complex covers 80,127 hectares (198,344 acres), or 803 square kilometers (310 square miles), encompassing parts of Aiken, Barnwell and Allendale counties in South Carolina in a principally rural area. SRS borders the Savannah River and is 40 kilometers (25 miles) southeast of Augusta, Georgia, and 32 kilometers (20 miles) south of Aiken in southwest-central South Carolina.

State: SC

PSO: DOE

Field Office:

Climate: H

Pop. density: M

Stakeholders:

State of South Carolina

Subsites:

Name	LTS Start	LTS Finish
Four Mile Branch Watershed	1996	9999
Lower Three Run Watershed	1997	9999
Pen Branch Watershed	2001	9999
Savannah River & Floodplain Swamp Watershed	1997	9999
Steel Creek Watershed	1996	9999
Upper Three Run Watershed	1996	9999

LONG-TERM STEWARDSHIP HIGHLIGHTS

Major Long-Term Stewardship Activities – institutional controls; surveillance and maintenance; operation/ maintenance of treatment systems; and monitoring of engineered units and groundwater *Total Site Area* - 80,127 hectares (198,344 acres)

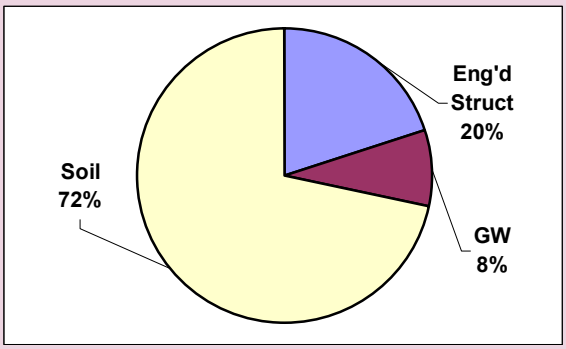
Estimated Volume of Residual Contaminants - to be determined

Portions Requiring Long-Term Stewardship as of 2006 - 10

Site Name: SRS Subportion Information

Number Of Subportions: 264

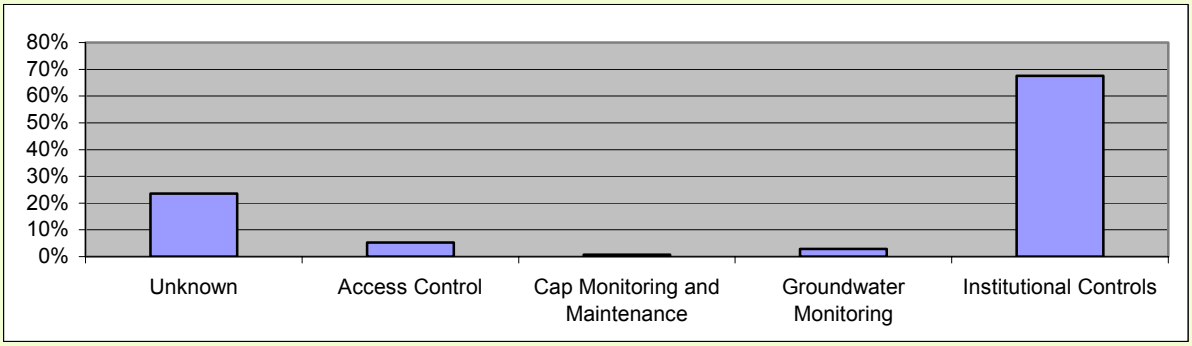
Number of Subportions by Media:



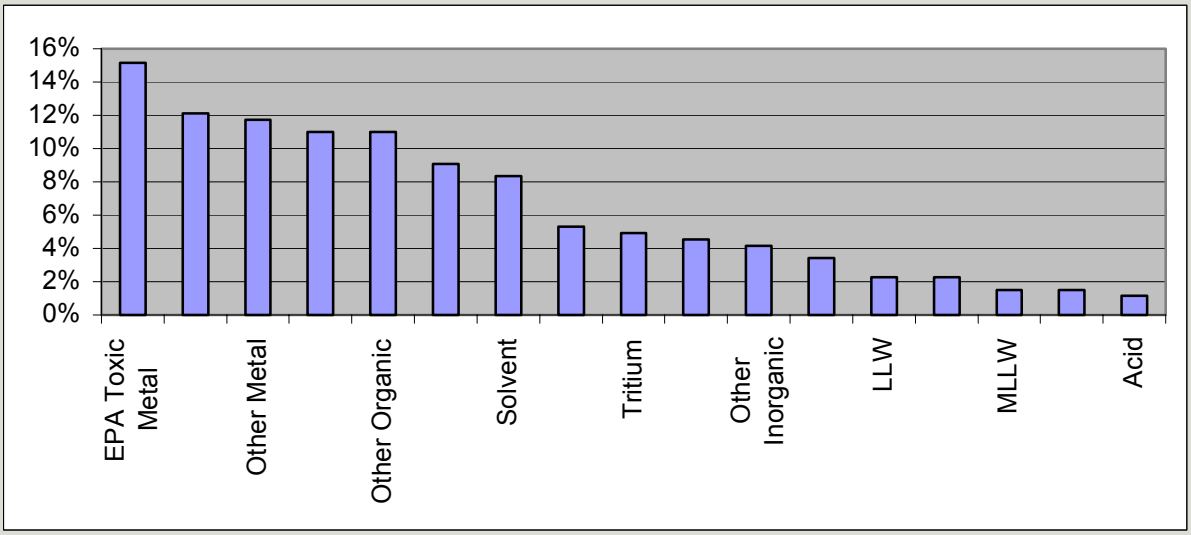
Subportion Distribution by Media Volume:

Unknown

Subportion Distribution by LTS Activity



Subportion Distribution by Contaminant Class



6 RECOMMENDATIONS

This Technical Baseline report, and the database used to generate the charts and tables in it, provide an advantage over any other set of data previously gathered in that the architecture of the database has provided for fields at the subportion level, in which to store data relevant to a number of user groups. Even when we recognize that in the current version the uniformity of the nomenclature varies from site to site, the ability to change the data within those fields to reflect more accurately the true state of those sites allows the various user groups to get updated information without the need for additional queries. As these data are verified and validated by the sites or their current managers during FY02, the current uncertainty will be reduced and the confidence level in the accuracy and completeness of the database will rise to allow the LTS S&T Roadmap group to generate reports and workscope for the various S&T workgroups using *actual* information. It is crucial that the assignments to these working groups be based on accurate information.

The Technical Baseline will allow the LTS S&T Roadmap to identify possible scenarios and assign priority to those with the highest positive impact in the LTS performance, cost and schedule.

The Technical Baseline can also help existing EM-50 funding organizations to have a better understanding of the magnitude and complexity of the LTS activities associated with the sites.

7 REFERENCES

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APPENDIX A: DATA ELEMENTS

The following section describes the data elements of interest for long term stewardship.

Site Data: A site is a contiguous geographically distinct area (as opposed to a sub-area of a site). These are equivalent to geographic sites in IPABS, e.g., INEEL, Amchitka Island, Gas Buggy Site, etc.

Name	The name of the site.
Description	Narrative description of site including location such as "two miles west of - - -."
Congressional District	The congressional district containing the site.
State	The state in which the site is located. The two letter Post Office state code will be used.
History	A narrative description of the historic activities at the site.
Total Site Area	The total area of the site in acres
Stakeholder Involvement	A text description of stakeholder involvement at the site.
Assumptions & Uncertainties	Narrative describing assumptions and uncertainties in planning for LTS.

Operations Office: This is the Operations Office responsible for a site and the date of transfer if a site is to be transferred from one Operations Office to another.

Site	Site Name
Operations Office	Future Operations Office,
Date	Date the site is scheduled to be transferred from one Operations Office to the other. Future implies a transfer is anticipated but the date is unknown. The year 2000 means the current operations office.

Climate Data: This is the meteorological data that describes attributes of climate that may impact LTS activities at the site. Note: in some cases, the data may have been recorded at nearby locations rather than the site itself.

Site	The name of the site.
Max 24-hour rainfall	The maximum rainfall recorded to have fallen in a 24-hour period.
Ave Yearly Rainfall	The average yearly rainfall (in inches) at the site.
Ave Yearly Snowfall	The average yearly snowfall (in inches) at the site.
Max. Temperature	Maximum recorded temperature (deg. F).
Min. Temperature	Minimum recorded temperature (deg. F).
Frost Depth	The maximum frost depth (in inches) recorded at the site.

Applicable Regulations: These are the regulations and other legally binding agreements that impacts long term stewardship.

Site	Name of site.
Regulation	CERCLA, RCRA, etc.
Description	Descriptions if required, for example, site specific agreements, etc.

National Priority List: These are the sites that are on the EPA NPL. Note: there may be more than one EPA ID per site, Hanford, or the same EPA ID may apply to multiple sites, e.g., St. Louis Downtown and Airport sites.

Site	The site on the EPA NPL.
EPA ID Number	The EPA identifier for the site.
EPA Hazard Ranking	The Hazard Ranking System (HRS) is the scoring system used by EPA's Superfund program to assess the relative threat associated with actual or potential releases of hazardous substances
Description	A text description where necessary describing the relationship between the site and the EPA breakdown.

Threat Data: These are the potential natural events and / or human activities that may adversely affect the LTS activities at the site.

Site	The site the threat affects.
Threat	Earthquake, floods, intrusion, etc.
Description	Narrative description of the threat and the potential impact on the site including the subsite or subportion directly affected if the threat does not impact the entire site.

Lawsuit Data: This is the data describing the lawsuits other legal actions regarding cleanup or LTS at the site.

Site	The site affected by the lawsuit.
Case Name	The name or identifier for the legal action.
Disposition	A narrative containing the disposition and other information regarding the legal action including the specific subsite or subportion directly affected if the lawsuit does not impact the entire site.

Stakeholder Concerns: These are the concerns that the stakeholders have concerning the site.

Site	The site about which the stakeholders are concerned.
Stakeholder	The name of the stakeholder.
Category	The category of the concern. “General” is an allowable value to enable association of a stakeholder group to a site even if a specific concern is not identified.
Concern	A narrative description of the concern the stakeholder has for the site. This should include the specific subsite or subportion if the concern is specific to a subsite or subportion.

Subsite Data: A subsite is a geographically contiguous and distinct area (which may involve residually contaminated facilities, engineered units, soil, groundwater, and / or surface water / sediments) for which cleanup, disposal, or stabilization will be completed and long term stewardship required. Subsites are discrete subsets of sites that are subject to distinct management attention. Note: each site must have at least one subsite.

Site	Site that contains the subsite.
Name	The name of the subsite, e.g., INTEC
Regulatory Name	The narrative with the regulatory designation of area(s) containing or contained in the subsite.

Description	A narrative description of the subsite including location information.
History	A narrative description of the historic activities at the subsite.
Area	Total area of the subsite in acres.
Geology	A short narrative providing a classification of local geology.
Hydrology	A short narrative providing a classification of local hydrology.
LTS Start Date	The fiscal year LTS started or is scheduled to start.
LTS Finish Date	The fiscal year LTS was completed or is scheduled to be completed.
Population Density	Population density of offsite areas near to the subsite. (high, medium, or low)
Future Population Density	Projected future population density of offsite areas near to the subsite. (high, medium, or low)
Adjacent Land Use	Land use of offsite land near the subsite, e.g., industrial, agricultural. This is a picklist.
Future Adjacent Land Use	Projected future land use of offsite land near the subsite, e.g., industrial, agricultural. This is a picklist.
Land Use	Land use at the subsite when turned over to LTS. This is a picklist, e.g., agricultural, industrial, etc.

Subportion: Subportions are the breakdown of subsites by media type and actions to be performed. A subportion consists of a single media type. Each subsite must have at least one subportion.

Subsite	The subsite at which the subportion is located.
Subportion Name	The common name of the subportion, e.g., TAN Building 616.
Regulatory Name	The narrative with the regulatory designation of areas containing or contained in the subportion.
Description	A narrative description of the subportion including location
Status	Current status of subportion. Value from picklist: remediation not started, remediation in progress, etc.
Media	The media type of the subportion: soil, groundwater, engineered structure, facility, or surface water / sediment.
Area	The area of the subportion in acres.
Latitude	The latitude of the subportion.
Longitude	The longitude of the subportion.
Water Table	Mean depth to water table in meters
Surface Water	Is surface water present or immediately adjacent to the subportion (yes/no)
LTS Start Date	The fiscal year LTS started or is scheduled to start.
LTS Finish Date	The fiscal year LTS was completed or is scheduled to be completed.
Environmental risk level	High, medium, or low. An estimate of the magnitude of the risk to the environment due to contaminants at the subportion. (from EPA definitions)
Human health risk level	High, medium, or low. An estimate of the magnitude of the risk to the human health due to contaminants at the subportion.
Comments	A narrative containing any addition important information about the subsite.

PSO Data: This data shows the schedule for transitioning responsibility for subportion between DOE PSOs, other state and Federal Agencies, and private entities responsible for activities.

Subportion	The site, subsite, or subportion identifier.
PSO	The DOE PSO, Federal Agencies, state or private entities responsible for activities at the site.
Date	The date the PSO becomes responsible for the site. The date 2000 means the current responsible party. Future implies a transfer is anticipated but the date is unknown.

Landlord Data: This data shows the current and planned future schedule of landlords for the site, subsite, or subportion. The landlord is the entity responsible for activities that involve the physical operation and maintenance of the site, subsite, or subportion. Note: if a value for landlord is not provided, it defaults to the higher level landlord.

Identifier	The site, subsite, or subportion identifier.
Landlord	The name of the landlord.
Date	The date the landlord changes to the new landlord. The date 2000 means the current landlord. Future implies a transfer is anticipated but the date is unknown.

Regulatory Documents: This is the data concerning the regulatory documents associated with the subportion. Note. A subportion does not have to have any or all of these documents.

Subportion	The subportion the documents are concerned with.
RI/FS Complete?	Y/N/NA if the RI/FS is complete.
Signed ROD?	Is the a signed ROD?, Y/N/NA
EPA ROD ID	ID assigned to the ROD by the EPA
ROD Date	The date the ROD was signed or anticipated date if it is not signed.
ROD Narrative	Narrative description of ROD data that should be recorded.
RD/RA Complete?	Y/N/NA indicating the RD/RD is complete
RD/RA Date	The date the RD/RA was completed or anticipated date if it is not completed.
O&M Complete?	Y/N/NA indicating the O&M Plan is complete
O&M Date	The date the O&M was completed or anticipated date if it is not completed.

Stewardship Activities: LTS stewardship activities that are underway or scheduled to be performed. Dates are required as groundwater monitoring may be completed by a specific date but institutional controls may be required in perpetuity. Note: the activities will be categories as institutional controls or engineered controls.

Name	Name of subportion
Activity	Stewardship activity, e.g., groundwater monitoring, pump and treat, etc. This is a picklist.
Description	A narrative description of the stewardship activity. Include all date information available.

Remediation Activities: Remediation activities are the activities performed while cleaning up the site prior to turnover to LTS.

Subportion Name	Name of subportion
Activity	Remediation activity, e.g., bioremediation, excavation, etc. This is a picklist.
Description	A narrative description of the remediation activity. Include all date information available.

Structures: This is the classification of structures at the subportion that influence the long-term stewardship activities.

Subportion Name	Name of subportion
Structure	Structure type, e.g., cap, barrier, etc. This is a picklist.
Description	A narrative description of the structure.

Pathways: This contains data describing pathways for potential contaminant migration that can adversely impact a resource such as drinking water source, etc.

Subportion Name	Name of subportion
Pathway	Pathway available for contaminant migration. This is a picklist.
Resource	Resource type, e.g., river, wildlife, etc. that can be threated by contamination via the pathway. This is a picklist.
Description	A narrative description of the pathway and the potentially threatened resource.

Contamination Data: Data concerning contaminant at the subportion. Note: not all subportions, for example engineered structures, will have cleanup levels.

Subportion Name	Name of subportion
Contaminant	Contaminant at the subportion that needs to be monitored or cleaned up.
Cleanup Level	The level of the contaminant remaining at the site after remediation when entering LTS.
Target Level	The level of the contaminant after LTS is completed, if different from cleanup level.
Chemical Form	The chemical form of the contaminant.
Amount	The current amount / volume / concentration of the contaminant at the site.
Distribution	Narrative describing the contaminant distribution.

Cost Data: This is the actual and projected cost for long term stewardship activities at the site, subsite, or subportion. Note a common cost representation must be determined, e.g., constant year dollars, etc.

Name	Name of site, subsite, or subportion
Amount	The actual or planned amount to be spent on long term stewardship during the specified period.
Period	Year or other time period, e.g., 2020 - 2025
Source	The source of the cost data. The default source will be the NDAA data.

Engineered Units: These are permanent land based disposal units such as landfills, vaults, and tank farms that have engineered contaminant structures such as liners, engineered side walls, and leachate collection systems.

Subportion	The name of the subportion containing the engineered units.
Type	The type of engineered unit, e.g., vault, disposal cell, etc.
Design Life	The design life in years of the disposal cell.
Waste Volume	The volume in cubic meters of waste in the engineered units.
Waste Type	The type of waste in the engineered units.

Soil: Soil areas are defined to include soils, burial grounds, burn pits, and other historical disposal areas with residual contamination after cleanup that do not have engineered containment structures. This includes soil area with caps over the residual contamination to prevent precipitation from infiltrating and transporting the contamination to groundwater.

Subportion	The name of the subportion.
Matrix	The subsurface matrix, e.g., soil, debris, etc.
Width	Mean width in meters. For pits, trenches, or a group of pits, it is the shorter dimension.
Length	Mean length in meters. For pits, trenches, or a group of pits, it is the longer dimension.
Depth	Mean depth to the bottom of the contamination in meters
Volume	Volume of the contaminated soil in meters cubed.

Groundwater: Groundwater areas are those areas where remediation will not return the groundwater to below drinking water standards or in some cases natural background levels.

Subportion	The name of the subportion.
Year Target Levels Achieved.	The fiscal year the target levels are or are planned to be achieved.
Width	This is the extent of the groundwater contamination in meters of the shorter dimension as reflected at the surface.
Length	This is the extent of the groundwater contamination in meters of the longer dimension as reflected at the surface.
Depth	The distance to the top of the contaminated groundwater in meters.
Volume	The volume of the contaminated groundwater in meters cubed.

Facility: Facilities are any contaminated buildings no longer in use where the future plans include maintaining the structure in place (regardless of assumed future use). This includes entombed facilities and facilities that will be demolished to grade with the below-grade structure capped in place.

Subportion	The name of the subportion.
Final State	Final state of the facility, e.g., entombed, reused, demolished to grade or capped, etc. This is a picklist.

Surface Water / Sediment: These are areas where remediation will not return surface water to below drinking water standards or to natural background levels and any sediments with residual contamination after cleanup.

Subportion	The name of the subportion.
Year Target Levels Achieved.	The fiscal year the target levels are or ar planned to be achieved.
Usage	Current or anticipated future use of surface water / sediment, e.g., recreational, agricultural, etc.
Width	Mean width in meters of the shorter dimension.
Length	Mean width in meters of the longer dimension.
Volume	Volume of contaminated water in cubic meters.

Stakeholder Data: These are organizations, public organizations, Federal, state, and local government regulators and agencies, and Tribal Nations involved in the LTS process.

Organization	Organization name, e.g., US EPA, City of Richland, etc.
Type	Organization type, local government, regulator, etc.
Description	A narrative description of the organization
Stakeholder POC	Point of Contact for the stakeholder organization.

POC Data: The POC is the point of contact for further information about a site, subsite, stakeholder group, etc.

Name	The name of the POC.
Title	The job title of the POC.
Organization	The organization to which the POC belongs, e.g. USDOE, Idaho Operations Office
Department	The department within the organization of the POC to which the POC belongs
Mailstop	The mailstop portion of the POC's address.
Street Address	The street address for the POC.
State	Two letter post office code, e.g., ID, SC
Zip Code	The zip code
Telephone	Telephone number of POC.
Email	Email address of the POC.

Contaminant Data: This is data describing the required specific characteristics of contaminants such as half-life and toxicity.

Contaminant	The name of the contaminant
Category	Contaminant category such as VOC, heavy metal, etc.
Toxicity	The toxicity of the contaminant
Half Life	The half-life of the contaminant.

APPENDIX B: LIST OF SUBSITES

	Site	Subsite
1	11e(2) Disposal Site	11e.(2) Disposal Site
2	Ashtabula Environmental Management Project	Ashtabula Environmental Management Project
3	Amchitka Island	Subsurface
4		Surface
5	(Quivira) Ambrosia Lake Site 2	Unknown
6	Ambrosia Lake Site	Site-wide
7	Argonne National Laboratory - East	300 Area
8		800 Area
9		CP-5
10		Rest of Site
11	Argonne National Laboratory - West	Experimental Breeder Reactor-II
12	Atlas Moab Mill	Site-wide
13	Bayo Canyon	Site-wide
14	Bluewater Site (Arco Bluewater)	Site-wide
15	Bodo Canyon Cell	Site-wide
16	(Union Pacific) Bear Creek Site	Site-wide
17	Brookhaven National Laboratory	Brookhaven Graphite Research Reactor and High Flux Beam Reactor D&D
18		Former Hazardous Waste Management Facility
19		Groundwater
20		Landfills
21		Other Radioactive Soils
22		Peconic River
23		Rest of Site
24	Burrell Site	Site-wide
25	Burro Canyon Disposal Cell	Site-wide
26	(Cotter) Canon City Site	Unknown
27	Canonsburg, PA	Site-wide
28	Center for Energy and Environmental Research	Site-wide
29	Cheney Disposal Cell	Site-wide
30	(UNC) Church Rock Site	Unknown
31	Central Nevada Test Area	Subsurface
32		Surface
33	(Conoco) Conquista Site	Site-wide
34	Durango Mill	Subsurface
35		Surface
36	(HECLA) Durita Site	Site-wide
37	Edgemont Site	Site-wide
38	Estes Gulch Disposal Cell	Site-wide
39	Falls City Site	Site-wide

	Site	Subsite
40	Fernald Environmental Management Project	Site-wide
41	Fermi National Accelerator Laboratory	Site-wide
42	(Dawn) Ford Site	Unknown
43	Fort Saint Vrain Independent Spent Fuel Storage Installation	Site-wide
44	(UMETCO) Gas Hills Site	Site-wide
45	Grand Junction Mill 1	Site-wide
46	Grand Junction Mill 2	Site-wide
47	(Homestake) Grant Site	Unknown
48	Green River Site	Subsurface
49	Green River Site	Surface
50	(ANC) Gas Hills Site	(ANC) Gas Hills Site
51	Gunnison Disposal Cell	Site-wide
52	Gunnison Mill	Subsurface
53	Hanford Site	100 B/C Area
54		100 D Area
55		100 F Area
56		100 H Area
57		100 K Area
58		100 N Area
59		100 Other Areas
60		1100 Area
61		200 Area North
62		200 Area PO1-1 Operable Unit Groundwater
63		300 Area
64		Arid Land Ecology
65		Environmental Restoration Disposal Facility
66		Riverland
67		Wahluke Slope (North Slope)
68	(Exxon) Highlands Site	(Exxon) Highlands Site
69	Hallam Nuclear Power Facility	Site-wide
70	Hoe Creek Underground Coal Gasification Site	Site-wide
71	Idaho National Engineering and Environmental Laboratory	Auxiliary Reactor Area Soils
72		Boiling Water Reactor Experiment Area
73		Central Facilities Area
74		Experimental Breeder Reactor-1
75		Idaho Nuclear Technology and Engineering Center Sites

	Site	Subsite
76	Idaho National Engineering and Environmental Laboratory	Ordinance Area
77		Other Test Area North Soils
78		Pad A
79		Power Burst Facility Soils
80		Stationary Low-Power Reactor-1 Burial Ground
81		Test Area North Building 616
82		Test Area North Soils
83		Test Area North Tanks
84		Test Reactor Area Ponds
85		Test Reactor Area Subsurface Soils
86	Kansas City Plant	Site-wide
87	Lawrence Berkeley National Laboratory	Building 51/64 VOC Plume
88		Building 71 Freon/VOC Plume
89		Building 75 Tritium Plume
90		Building 88 Area
91		Old Town
92	Lakeview Mill	Site-wide (Lakeview Mill)
93	Lakeview Site	Site-wide(Lakeview Site)
94	Los Alamos National Laboratory	Site-wide
95	(SOHIO) LBAR Site	Site-wide
96	(Rio Algom) Lisbon Valley Site	Unknown
97	Lawrence Livermore National Laboratory - Site 300	OU #1 GSA
98		OU #2 Building 834
99		OU #3 Pit 6
100		OU #4 Building 815
101		OU #5 Building 850 - Pits 3&5
102		OU #6 Building 854
103		OU #7 Building 832
104		OU #8 Rest of Site

	Site	Subsite
105	Lawrence Livermore National Laboratory - Main Site	Building 292 Area
106		Building 331 Area
107		Building 419/511
108		Treatment Facility 518
109		Treatment Facility 5475
110		Treatment Facility A
111		Treatment Facility B
112		Treatment Facility C
113		Treatment Facility D
114		Treatment Facility E
115		Treatment Facility F/406
116		Treatment Facility G
117	Lowman, ID	Site-wide
118	Lovelace Respiratory Research Institute	Diesel Spill Site
119		Hot Ponds
120		Sewage Lagoon Site
121	(Pathfinder) Lucky Mc Site	Site-wide
122	Maybell Mill Site	Site-wide
123	(UMETCO) Maybell Site 2	Site-wide
124	Mexican Hat, UT	Site-wide
125	Miamisburg Environmental Management Project	Site-wide
126	Monument Valley, AZ	Subsurface
127	Monticello Mill Site and Vicinity Properties	Disposal Site
128		Groundwater
129		Supplemental Standards Area
130	Naturita Mill	Subsurface
131	Naturita Site	Site-wide
132	New Rifle, CO	Subsurface
133	Naval Oil Shale Reserves Site	Site-wide

	Site	Subsite
134	Naval Petroleum Reserve No. 3 Landfill / Landfarm	Site-wide
135	Nevada Test Site and Tonapah Test Range	Area 3 Radioactive Waste Management Site
136		Area 5 Radioactive Waste Management Site
137		Industrial Sites
138		Soil Sites
139		Underground Test Area
140	Slick Rock Old North Continent	Subsurface
141	Old Rifle	Subsurface
142	Oak Ridge Reservation	Bear Creek Watershed
143		Bethel Valley Watershed
144		East Tennessee Technolgy Park Watershed
145		Offsite
146		Upper East Fork Poplar Creek Watershed
147		Melton Valley Watershed
148	(Chevron) Panna Maria Site	Site-wide
149	Pantex Plant	Risk Reduction Standard Sites 2
150	Pantex Plant	Risk Reduction Standard Sites 3
151	Parkersburg Site (Amax)	Site-wide
152	Paducah Gaseous Diffusion Plant	Site-wide
153	Gnome-Coach Site	Subsurface
154	Gnome-Coach Site	Surface
155	Pinellas Plant	4.5 Acre Site
156		Building 100
157		Northeast Site
158		Wastewater Neutralization Area/Building 200 Area
159	Piqua Nuclear Power Facility	Site-wide
160	Portsmouth Gaseous Diffusion Plant	Quadrant I
161		Quadrant II
162		Quadrant III
163		Quadrant IV
164	Princeton Plasma Physics Laboratory	Site-wide
165	Rio Blanco Site	Subsurface
166		Surface
167	Gasbuggy Site	Subsurface
168		Surface
169	Rulison Site	Subsurface
170	Project Shoal	Subsurface
171	(Exxon) Ray Point Site	Site-wide

	Site	Subsite
172	Rocky Flats Environmental Technology Site	Site-wide
173	Riverton Site	Site-wide
174	Rock Springs Oil Shale Retort Site	Site-wide
175	Site A/Plot M, Palos Forest Preserve	Site-wide
176	Salt Lake City Mill	Site-wide
177	Savannah River Site	247-F Naval Fuel Manufacturing Facility
178		D Area Heavy Water Facilities
179		F Tank Area
180		Four Mile Branch Watershed
181		Heavy Water Component Test Reactor
182		Lower Three Run Watershed
183		M Area Fuel/Target Manufacturing Facilities
184		Pen Branch Watershed
185		Savannah River & Floodplain Swamp Watershed
186		Steel Creek Watershed
187		Upper Three Run Watershed
188	Salmon Site	Subsurface
189		Surface
190	South Clive Disposal Cell	Site-wide
191	(WHI) Sherwood Site	Site-wide
192	Shiprock Site	Subsurface
193		Surface
194	(Pathfinder) Shirley Basin Site 1	Site-wide
195	(Petrotomics) Shirley Basin Site 2	Site-wide
196	Stanford Linear Accelerator Center	Site-wide
197	Sandia National Laboratories - CA	Fuel Oil Spill
198		Groundwater
199		Navy Landfill
200	Sandia National Laboratories - NM	Corrective Action Management Unit
201		Chemical Waste Landfill
202		Groundwater
203		Mixed Waste Landfill
204		Signed & Fenced Soil
205		Signed Soils
206	Spook Site	Site-wide
207	Separations Process Research Unit	Unknown
208	(WNI) Split Rock Site	Site-wide
209	(Plateau) Shootaring Canyon Site	Unknown
210	(Kennecott) Sweetwater Site	Unknown
211	Tuba City, AZ	Subsurface
212		Surface
213	Slick Rock Union Carbide	Subsurface
214	(UMETCO) Uravan Site	Unknown

	Site	Subsite
215	Westlake Disposal Site	Unknown
216	Waste Isolation Pilot Plant	Unknown
217	(EFN) White Mesa Site	Unknown
218	Weldon Spring Site	Chemical Plant
219		Quarry Groundwater
220	West Valley Demonstration Project	Unknown

APPENDIX C: SUBPORTIONS BY MEDIA AND REMEDIATION ACTIVITY

Media	Remediation Activity	Number of Subportions
Soil	Retrieve and Dispose	147
Soil	Cap	103
Engineered Structure	Cap	95
Engineered Structure	None	55
Groundwater	Natural Attenuation	34
Groundwater	Pump and Treat	33
Groundwater	None	27
Engineered Structure	Unknown	26
Engineered Structure	Stabilization	23
Engineered Structure	Selective Retrieval	23
Engineered Structure	Retrieve and Dispose	20
Soil	None	20
Facility	Retrieve and Dispose	17
Soil	Bioremediation	16
Soil	Unknown	15
Soil	Water Treatment	14
Soil	Stabilization	12
Soil	Vapor Extraction	11
Facility	D&D	10
Groundwater	Groundwater Treatment	10
Soil	Soil Washing	10
Soil	Natural Attenuation	10
Facility	Selective Retrieval	9
Soil	Barriers	9
Groundwater	Vapor Extraction	8
Groundwater	Unknown	7
Surface Water / Sediment	Retrieve and Dispose	7
Engineered Structure	Other	6
Surface Water / Sediment	In-situ Remediation	6
Groundwater	Cap	5
Groundwater	Retrieve and Dispose	4
Surface Water / Sediment	Unknown	4
Engineered Structure	Barriers	3
Engineered Structure	Vapor Extraction	3
Facility	Unknown	3
Facility	Storage	3
Groundwater	Stabilization	3
Soil	Pump and Treat	3
Engineered Structure	D&D	2
Engineered Structure	Water Treatment	2
Engineered Structure	pump and Treat	2
Groundwater	In-situ Remediation	2

Media	Remediation Activity	Number of Subportions
Groundwater	Barriers	2
Groundwater	Bioremediation	2
Groundwater	Other	2
Soil	Selective Retrieval	2
Soil	In-situ Thermal Treatment	2
Soil	Other	2
Surface Water / Sediment	Natural Attenuation	2
Surface Water / Sediment	Stabilization	2
Surface Water / Sediment	Barriers	2
Engineered Structure	Natural Attenuation	1
Engineered Structure	Groundwater Treatment	1
Engineered Structure	Bioremediation	1
Engineered Structure	Thermal Desorption	1
Facility	Stabilization	1
Facility	None	1
Facility	Other	1
Groundwater	Ion Exchange	1
Groundwater	Water Treatment	1
Groundwater	In-situ Electro	1
Soil	D&D	1
Soil	Remove and Dispose	1
Soil	Thermal Desorption	1
Soil	Groundwater Treatment	1
Surface Water / Sediment	None	1
Surface Water / Sediment	Other	1
Surface Water / Sediment	Pump and Treat	1

APPENDIX D: SUBPORTIONS BY STEWARDSHIP ACTIVITY

LTS Activity	Number of Subportions
Access Control	397
Monitoring	364
Institutional Controls	349
Groundwater Monitoring	254
Deed Restrictions	156
Cap Monitoring and Maintenance	123
None	101
Maintenance and Surveillance	40
Maintenance	29
Inspections	23
Other	14
Cell Monitoring and Maintenance	12
Unknown	11
Pump and Treat	9
Engineered Unit Maintenance	7
3-D Modeling	6
O&M of Treatment Systems	6
Modeling	6
Surveillance and Maintenance	6
Program Management	6
Vapor Extraction	5
Sampling	3
Surface Water Monitoring	3
Extraction Wells	2
Barrier Maintenance	2
Groundwater Treatment	2
Surface water	2
To Be Determined	2
Engineered Unit Monitoring	1
Air Monitoring	1
In-Situ Treatment	1
Monitoring Shale Pile	1
Cell Maintenance and Monitoring	1
Environmental Monitoring	1
Injection wells	1
Management Controls	1
Monitoring and Surveillance	1
Water Discharge Restrictions	1
Monitoring Well Replacement	1
Natural Flushing	1
Not identified	1
O&M of P&T facility	1
Radiological Monitoring	1
Radiological surveys	1

LTS Activity	Number of Subportions
Record Keeping	1
Regulatory & Community Interaction	1
Seepage Treatment	1
Site Monitoring	1
Monitoring and Maintenance	1

APPENDIX E: CONTAMINANTS BY SUBPORTION

Contaminant	Number of Subportions
Sr-90	119
H-3	110
U	100
VOC	91
Pb	90
Co-60	87
Cs-137	75
U-238	71
TCE	68
Cr	68
Metals	67
Pu	61
As	56
PCB	54
Pu-239	51
Ra	50
HE	49
Cs	48
Hg	48
Radionuclides	48
Cd	46
Nitrate	45
Ru	38
Petroleum Hydrocarbons	37
Pu-240	36
Th	32
Ni	29
Asbestos	28
PCE	28
Pesticides	27
Se	26
Ra-226	26
Benzene	25
Ba	25
Toluene	23
Zn	22
Acetone	22
Chloroform	21
Trichloroethylene	20
SVOC	20
C-14	20
Eu-155	20
Tetrachloroethylene	19
Mn	19

Contaminant	Number of Subportions
U-234	19
Cu	18
Pu-238	18
Chlorinated Solvents	18
Organics	18
U-235	17
Mo	17
Be	17
HMX	16
Ni-63	16
Am-241	16
Am	16
burned solvents	15
Al	15
PAH	13
Eu	13
Xylene	12
Ag	12
Nitration Compounds	11
Tc-99	11
Carbon Tetrachloride	11
Methyl Ethyl Ketone	11
Eu-152	11
Eu-154	11
V	10
Inorganics	10
Heavy Metals	10
alpha	10
Fission Products	10
Methylene Chloride	9
Solvents	9
Th-230	9
Tc	9
1,1-Dichloroethylene	9
LLW	8
TPH	8
K-40	8
cis-1,2-Dichloroethene	8
I-129	8
Th-232	8
Dioxin	8
Sulfate	8
Fe	8
RDX	8
Sb	7
Ethyl Benzene	7

Contaminant	Number of Subportions
1,1,1-Trichloroethane	7
Th-228	7
Ca	7
Perchlorate	6
Cyanide	6
Vinyl Chloride	6
Cs-136	6
Cm	6
Trichlorofluoromethane	6
Cl-36	5
1,2-Dichloroethane	5
activation products	5
Ag-108m	5
Ce-137	5
Cs-134	5
Cl	5
DCE	5
Cobalt-60	5
Na	5
N	5
MLLW	5
Chloride	5
Ra-228	5
Trichloroethene	5
CDDs	4
Fluoride	4
Hexavalent Chromium	4
Mg	4
Methane	4
Tetrachloroethene	4
Pu-241	4
Tl	4
Chloradane	4
CDFs	4
BTEX	4
U (15 L/kg)	4
Np-237	4
Pb-210	4
U (325 L/kg)	4
U (depleted)	4
Organic Solvents	4
Ethane	3
Li	3
Sulfide	3
Tetrachloroethane	3
Total Halogenated Hydrocarbons	3

Contaminant	Number of Subportions
TNT	3
Kr-85	3
Dicholoethane	3
1,2-trans-Dichloroethane	3
Ethylene	3
Naphthalene	3
Sb-125	3
Trivalent Chromium	3
Benzo(a)pyrene	3
Trichloroethelene	3
Sm-151	3
Acrylonitrile	3
1,1-Dichloroethane	3
DDT	2
Cs-135	2
1,2-cis-Dichloroethene	2
F	2
Sn--126	2
Dibenzofurans	2
Uranium trioxide	2
Dichlorodifluoromethane	2
Sr	2
Freon 113	2
Arochlor-1248	2
Aroclor-1242	2
Trichlorotrifluoroethane	2
Base Neutral Acids	2
Trichloromethane	2
Benzo(b)flouranthene	2
1,2-Dichloroethylene	2
Ca-41	2
Sulfur Compounds	2
Uranium hexafluoride	2
Ac-227	2
cis-1,2-Dichloroethylene	2
2,3,7,8-TCDD	2
Co	2
TEC	2
Benzopyrene	2
propylene	2
octane	2
Hydrofluoric Acid	2
Pa-231	2
Pa-234	2
Ni-59	2

Contaminant	Number of Subportions
Pentane	2
Zr-93	2
Pm-147	2
Po	1
NaK	1
Bi-207	1
Po-210	1
Nb-94	1
Nb-93m	1
Nb-93	1
NaOH	1
Beryllium-Oxide	1
B	1
Bi-210	1
Trighloroethylene	1
Bromodichloromethane	1
Aroclor	1
Trichloroethelyne	1
C	1
NaCl	1
Trans-1, 2-Dichloroethene	1
Potassium Chloride	1
Toxic Metals	1
Caustic Sludge	1
TOX	1
Potassium Hydroxide	1
bis (2-ethylhexyl) phthalate	1
U-2381	1
Pd-107	1
paint thinner	1
1,2,4-Trimethylbenzene	1
Uranium Oxide	1
1,3, 5-Trimethylbenzene	1
P	1
2,4-DNT	1
4-Amino-2, 6-Dinitrotoluene	1
Ac	1
Oxalic acid	1
Orthophosphate	1
Aromatic hydrocarbons	1
Actinium-227	1
Triuranium Octaoxide	1
U-236	1
U-233	1
Aldrin	1
Nitroaromatics	1

Contaminant	Number of Subportions
nitrites	1
Phenols	1
Am-242m	1
Am-243	1
CH-THU	1
Nickel-Chromium	1
Potassium Nitrate	1
phenolics	1
Fe-55	1
Ce	1
PCB-1254	1
Spent carbon-containing explosives	1
hydrocarbon solvents	1
Sodium Sulfate	1
HNS	1
Ethylene Dibromide	1
Ethylene Glycol	1
Sodium Nitrate	1
Sodium Hydroxide	1
Sn-121m	1
Sb-126	1
Rn	1
Sn	1
dibenzo-p-furan	1
herbicides	1
Sb-126m	1
Former Acid	1
Fr-223	1
Freon	1
Freon 11	1
HE Sludge	1
Friable asbestos	1
Furans	1
scintillation fluid	1
H2SO4	1
Sb-129	1
Hexahydrobenzene	1
congeners dibenzo-p-dioxin	1
Mn-54	1
HE Residue	1
TOC	1
Potassium Sulfate	1
Tetrahydofuran	1
Pu-140	1
Tetracholorethylene	1
Methanol	1

Contaminant	Number of Subportions
Pu-242	1
Cm-243	1
Cm-244	1
Pyrophorics	1
Hydrocarbons	1
Te-125m	1
Dichloroethene	1
TBOS/TKEBS	1
TATb	1
Leaded Paint	1
Ra-226/228	1
Inorganic salts	1
Styrene	1
Sr-89	1
Inorganic Anions	1
Cyclohexane	1
DCA	1
Spent nonhalogenated solvents	1
Inorganic Acids	1
Lindane	1

APPENDIX F: STAKEHOLDER – SITE ASSIGNMENTS

State	Site Name	Stakeholder
AK	Amchitka Island	US Dept of Fish and Wildlife
AK	Amchitka Island	State of Alaska
AK	Amchitka Island	Aleutian/Probilof Islands Association
AZ	Monument Valley, AZ	Indian Health Service
AZ	Monument Valley, AZ	State of Arizona
AZ	Monument Valley, AZ	Navajo Nation
AZ	Tuba City, AZ	Navajo Nation
AZ	Tuba City, AZ	State of Arizona
CA	Lawrence Berkeley National Laboratory	State of California
CA	Lawrence Berkeley National Laboratory	City of Berkeley Environmental Advisory Commission
CA	Lawrence Berkeley National Laboratory	University of California
CA	Lawrence Berkeley National Laboratory	San Francisco Bay Regional Water Quality Control Board
CA	Lawrence Berkeley National Laboratory	California Environmental Protection Agency Department of Toxic Substances Control
CA	Lawrence Livermore National Laboratory - Main Site	Tri-Valley Communities Against Radioactive Environment
CA	Lawrence Livermore National Laboratory - Main Site	Environmental Protection Agency
CA	Lawrence Livermore National Laboratory - Main Site	City of Livermore
CA	Lawrence Livermore National Laboratory - Main Site	State of California
CA	Lawrence Livermore National Laboratory - Site 300	California Department of Toxic Substances Control
CA	Lawrence Livermore National Laboratory - Site 300	California Central Valley Regional Water Quality Control Board
CA	Lawrence Livermore National Laboratory - Site 300	Tri-Valley Communities Against a Raioactive Environment
CA	Lawrence Livermore National Laboratory - Site 300	Local community
CA	Lawrence Livermore National Laboratory - Site 300	University of California
CA	Sandia National Laboratories - CA	State of California Regional Water Control Board
CA	Sandia National Laboratories - CA	State of California
CA	Stanford Linear Accelerator Center	San Francisquito Creek Watershed Coordinated Resource and Planning Steering Committee task forces
CA	Stanford Linear Accelerator Center	Standford University
CO	(Cotter) Canon City Site	State of Colorado
CO	(Cotter) Canon City Site	Cotter Corporation
CO	(HECLA) Durita Site	U.S. Nuclear Regulatory Commission (NRC)

State	Site Name	Stakeholder
CO	(HECLA) Durita Site	State of Colorado
CO	(HECLA) Durita Site	Colorado Department of Public Health and Environment
CO	(UMETCO) Maybell Site 2	UMETCO Minerals Corporation
CO	(UMETCO) Maybell Site 2	Colorado Department of Public Health and Environment
CO	(UMETCO) Maybell Site 2	State of Colorado
CO	(UMETCO) Uravan Site	Colorado Department of Public Health
CO	(UMETCO) Uravan Site	UMETCO Minerals Corporation
CO	(UMETCO) Uravan Site	State of Colorado
CO	Bodo Canyon Cell	State of Colorado
CO	Burro Canyon Disposal Cell	State of Colorado
CO	Cheney Disposal Cell	State of Colorado
CO	Durango Mill	The City of Durango
CO	Durango Mill	Animas-La Plata Water Conservancy District
CO	Durango Mill	State of Colorado
CO	Estes Gulch Disposal Cell	State of Colorado
CO	Fort Saint Vrain Independent Spent Fuel Storage Installation	Local Community
CO	Fort Saint Vrain Independent Spent Fuel Storage Installation	State of Colorado
CO	Grand Junction Mill 1	The City of Grand Junction
CO	Grand Junction Mill 1	State of Colorado
CO	Grand Junction Mill 2	Local Community
CO	Grand Junction Mill 2	State of Colorado
CO	Gunnison Disposal Cell	Town of Gunnison
CO	Gunnison Disposal Cell	Gunnison County
CO	Gunnison Disposal Cell	State of Colorado
CO	Gunnison Mill	Borough of Blairsville
CO	Gunnison Mill	Indiana County
CO	Gunnison Mill	Burrell Township
CO	Gunnison Mill	Town of Gunnison
CO	Gunnison Mill	County of Gunnison
CO	Gunnison Mill	State of Colorado
CO	Maybell Mill Site	State of Colorado
CO	Naturita Mill	Cyprus/Foote Mineral Company
CO	Naturita Mill	State of Colorado
CO	Naturita Site	State of Colorado
CO	Naval Oil Shale Reserves Site	U.S. Bureau of Land Management
CO	Naval Oil Shale Reserves Site	State of Colorado
CO	New Rifle, CO	State of Colorado
CO	New Rifle, CO	City of Rifle
CO	New Rifle, CO	NRC
CO	Old Rifle	Local Government

State	Site Name	Stakeholder
CO	Old Rifle	State of Colorado
CO	Rio Blanco Site	Department of Interior
CO	Rio Blanco Site	State of Colorado
CO	Rocky Flats Environmental Technology Site	Stewardship Dialogue Group
CO	Rocky Flats Environmental Technology Site	U.S. Fish and Wildlife Service
CO	Rocky Flats Environmental Technology Site	National Renewable Energy Laboratory
CO	Rocky Flats Environmental Technology Site	Rocky Flats Field Office
CO	Rocky Flats Environmental Technology Site	Rocky Flats Citizen Advisory Board
CO	Rocky Flats Environmental Technology Site	Kaiser-Hill
CO	Rocky Flats Environmental Technology Site	State of Colorado
CO	Rocky Flats Environmental Technology Site	Rocky Flats Coalition of Local Governments
CO	Rulison Site	Private Ownership
CO	Rulison Site	Colorado Department of Public Health and Environment
CO	Rulison Site	State of Colorado
CO	Slick Rock Old North Continent	U.S. Nuclear Regulatory Commission
CO	Slick Rock Old North Continent	UMETCO
CO	Slick Rock Union Carbide	UMETCO Minerals Corporation
CO	Slick Rock Union Carbide	State of Colorado
FL	Pinellas Plant	Florida Department of Environmental Protection
FL	Pinellas Plant	Pinellas County, Florida
FL	Pinellas Plant	State of Florida
FL	Pinellas Plant	Pinellas County Industry Council
ID	Argonne National Laboratory - West	Department of Energy
ID	Argonne National Laboratory - West	U.S. Park Service
ID	Argonne National Laboratory - West	Idaho Department of Fish and Game
ID	Argonne National Laboratory - West	State of Idaho
ID	Argonne National Laboratory - West	U.S. Forest Service
ID	Argonne National Laboratory - West	Local Community
ID	Argonne National Laboratory - West	Shoshone-Bannick Tribal Government
ID	Argonne National Laboratory - West	U.S. Bureau of Land Management
ID	Idaho National Engineering and Environmental Laboratory	State of Idaho
ID	Idaho National Engineering and Environmental Laboratory	U.S. Forest Service

State	Site Name	Stakeholder
ID	Idaho National Engineering and Environmental Laboratory	U.S. Park Service
ID	Idaho National Engineering and Environmental Laboratory	The Idaho Department of Fish and Game
ID	Idaho National Engineering and Environmental Laboratory	Community Organizations
ID	Idaho National Engineering and Environmental Laboratory	U.S. Bureau of Land Management
ID	Idaho National Engineering and Environmental Laboratory	Shoshone-Bannock Tribes
IL	Argonne National Laboratory - East	Community Groups
IL	Argonne National Laboratory - East	Community Leaders Round Table
IL	Fermi National Accelerator Laboratory	Universities Research Association, Inc
IL	Fermi National Accelerator Laboratory	State of Illinois
IL	Site A/Plot M, Palos Forest Preserve	State of Illinois
IL	Site A/Plot M, Palos Forest Preserve	Palos Forest Preserve District of Cook County
KY	Paducah Gaseous Diffusion Plant	Commonwealth of Kentucky
MO	Weldon Spring Site	Weldon Spring Citizens
MO	Westlake Disposal Site	State of Missouri
MO	Westlake Disposal Site	City of St. Louis
MS	Salmon Site	Lamar County, Mississippi
MS	Salmon Site	Stae of Mississippi
NE	Hallam Nuclear Power Facility	City of Lincon
NE	Hallam Nuclear Power Facility	Lancaster County
NE	Hallam Nuclear Power Facility	State of Nebraska
NJ	Princeton Plasma Physics Laboratory	Princeton University
NJ	Princeton Plasma Physics Laboratory	State of New Jersey
NM	(Homestake) Grant Site	State of New Mexico
NM	(Quivira) Ambrosia Lake Site 2	Quivira Mining Company
NM	(Quivira) Ambrosia Lake Site 2	City of Ambrosia Lake
NM	(Quivira) Ambrosia Lake Site 2	State of New Mexico
NM	(SOHIO) LBAR Site	State of New Mexico
NM	(UNC) Church Rock Site	United Nuclear Corporation (UNC)
NM	(UNC) Church Rock Site	McKinley County
NM	(UNC) Church Rock Site	Environmental Protection Agency (EPA)
NM	Ambrosia Lake Site	State of New Mexico
NM	Ambrosia Lake Site	McKinley County
NM	Bayo Canyon	County of Santa Fe
NM	Bayo Canyon	County of Los Alamos
NM	Bayo Canyon	State of New Mexico
NM	Bluewater Site (Arco Bluewater)	State of New Mexico
NM	Bluewater Site (Arco Bluewater)	City of Grants
NM	Gasbuggy Site	Department of Interior
NM	Gasbuggy Site	State of New MexicoDepartment of Interio,
NM	Gasbuggy Site	Jicarilla Apache Tribe
NM	Gnome-Coach Site	State of New Mexico

State	Site Name	Stakeholder
NM	Los Alamos National Laboratory	Citizens Advisory Board
NM	Los Alamos National Laboratory	Los Alamos County
NM	Los Alamos National Laboratory	Sante Fe County
NM	Los Alamos National Laboratory	Community Relations Office
NM	Los Alamos National Laboratory	EPA
NM	Los Alamos National Laboratory	State of New Mexico Environment Department
NM	Los Alamos National Laboratory	Pueblos
NM	Lovelace Respiratory Research Institute	State of New MexicoAlbuquerque
NM	Lovelace Respiratory Research Institute	City of Albuquerque
NM	Sandia National Laboratories - NM	State of New Mexico
NM	Sandia National Laboratories - NM	Local Citizens Board
NM	Sandia National Laboratories - NM	Bernalillo County
NM	Sandia National Laboratories - NM	U. S. Air Force
NM	Sandia National Laboratories - NM	U. S. Forest Service
NM	Sandia National Laboratories - NM	Regulatory Authorities
NM	Shiprock Site	State of New Mexico
NM	Shiprock Site	Navajo Nation
NM	Shiprock Site	San Juan County
NM	Waste Isolation Pilot Plant	State of New Mexico
NV	Central Nevada Test Area	State of Nevada
NV	Central Nevada Test Area	Native American Graves Protection
NV	Central Nevada Test Area	Consolidated Group of Tribes and Organizations
NV	Central Nevada Test Area	Public
NV	Central Nevada Test Area	Community Advisory Board
NV	Central Nevada Test Area	U. S. Department of Agriculture
NV	Project Shoal	State of Nevada
NV	Project Shoal	City of Fallon
NV	Project Shoal	Nevada Department of Conservation and Natural Resources
NV	Project Shoal	Department of Defense
NY	Brookhaven National Laboratory	Brookhaven Science Associates
NY	Brookhaven National Laboratory	State of New York
NY	Brookhaven National Laboratory	Battelle Memorial Institute
NY	Brookhaven National Laboratory	State University of New York at Stony Brook
NY	Brookhaven National Laboratory	New York Department of Environmental Conservation
NY	Brookhaven National Laboratory	EPA
NY	Separations Process Research Unit	Schenectady, New York
NY	Separations Process Research Unit	Knolls Atomic Power Laboratory
NY	Separations Process Research Unit	State of New York
NY	West Valley Demonstration Project	State of New York
NY	West Valley Demonstration Project	New York State Energy Research and Development Authority
OH	Ashtabula Environmental Management Project	State of Ohio

State	Site Name	Stakeholder
OH	Ashtabula Environmental Management Project	Ohio Department of Health
OH	Ashtabula Environmental Management Project	City of Ashtabula
OH	Ashtabula Environmental Management Project	Ohio Environmental Protection Agency
OH	Fernald Environmental Management Project	State of Ohio
OH	Fernald Environmental Management Project	Long-Term Stewardship Committee
OH	Fernald Environmental Management Project	District Chief for the Ohio EPA
OH	Fernald Environmental Management Project	Fernald Residents for Environmental Safety and Health
OH	Fernald Environmental Management Project	Fernald Community Reuse Organization
OH	Fernald Environmental Management Project	Fernald Citizens Advisory Board
OH	Miamisburg Environmental Management Project	Mound Action Committee
OH	Miamisburg Environmental Management Project	Miamisburg Mound Community Improvement Corporation
OH	Miamisburg Environmental Management Project	Miamisburg Environmental, Safety, and Health Group
OH	Miamisburg Environmental Management Project	City of Miamisburg, Ohio
OH	Miamisburg Environmental Management Project	Mound Reuse Committee
OH	Piqua Nuclear Power Facility	City of Piqua
OH	Piqua Nuclear Power Facility	State of Ohio
OH	Portsmouth Gaseous Diffusion Plant	City of Columbus,
OH	Portsmouth Gaseous Diffusion Plant	State of Ohio
OH	Portsmouth Gaseous Diffusion Plant	Village of Piketon
OH	Portsmouth Gaseous Diffusion Plant	Ohio Environmental Protection Agencies
OR	Lakeview Mill	City of Lakeview
OR	Lakeview Mill	State of Oregon
OR	Lakeview Mill	Lake County
OR	Lakeview Site	Town of Lakeview
OR	Lakeview Site	Lake County
OR	Lakeview Site	State of Oregon
PA	Burrell Site	State of Pennesylvania
PA	Canonsburg, PA	State of Pennsylvania
PA	Canonsburg, PA	Borough of Canonsburgh
PR	Center for Energy and Environmental Research	La Liga Ecological Puertorriquena
PR	Center for Energy and Environmental Research	Puerto Rico

State	Site Name	Stakeholder
PR	Center for Energy and Environmental Research	Puerto Rico Electric Power Authority
PR	Center for Energy and Environmental Research	Frente Unido Ameiental
SC	Savannah River Site	State of South Carolina
SD	Edgemont Site	State of South Dakota
SD	Edgemont Site	Tennessee Valley Authority (TVA)
TN	Oak Ridge Reservation	Tennessee Valley Authority
TN	Oak Ridge Reservation	U. S. Army Corps of Engineers
TN	Oak Ridge Reservation	State of Tennessee
TN	Oak Ridge Reservation	City of Oak Ridge
TN	Oak Ridge Reservation	Tennessee Department of Environment and Conservation (TDEC)
TN	Oak Ridge Reservation	U. S. Environmental Protection Agency
TX	(Chevron) Panna Maria Site	State of Texas
TX	(Chevron) Panna Maria Site	Texas Bureau of Radiation Control
TX	(Chevron) Panna Maria Site	Chevron Corporation
TX	(Conoco) Conquista Site	State of Texas
TX	(Conoco) Conquista Site	Continental Oil Company
TX	(Exxon) Ray Point Site	Exxon Mobile Corporation
TX	(Exxon) Ray Point Site	Texas Bureau of Radiation Control
TX	Falls City Site	State of Texas
TX	Pantex Plant	State of Texas
TX	Pantex Plant	Adjacent Land Owners
TX	Pantex Plant	Pantex Plant Environmental Task Force
TX	Pantex Plant	Pantex Plant Citizen's Advisory Board
TX	Pantex Plant	League of Wemon Voters
UT	(EFN) White Mesa Site	State of Utah
UT	(EFN) White Mesa Site	International Uranium Corporation
UT	(Plateau) Shootaring Canyon Site	State of Utah
UT	(Plateau) Shootaring Canyon Site	U.S. Energy Corporation
UT	(Rio Algom) Lisbon Valley Site	Rio Algom
UT	(Rio Algom) Lisbon Valley Site	State of Utah
UT	11e(2) Disposal Site	State of Utah
UT	11e(2) Disposal Site	Envirocare of Utah
UT	Atlas Moab Mill	State of Utah
UT	Atlas Moab Mill	National Academy of Sciences
UT	Green River Site	State Of Utah
UT	Mexican Hat, UT	Navajo Nation
UT	Mexican Hat, UT	State of Utah
UT	Monticello Mill Site and Vicinity Properties	Utah Department of Transportation
UT	Monticello Mill Site and Vicinity Properties	City of Monticello
UT	Monticello Mill Site and Vicinity Properties	Utah State Engineer’s Office.

State	Site Name	Stakeholder
UT	Monticello Mill Site and Vicinity Properties	State Of Utah
UT	Salt Lake City Mill	State of Utah
UT	Salt Lake City Mill	Residents of Salt Lake City
UT	Salt Lake City Mill	Central Valley Wastewater Treatment District;
UT	South Clive Disposal Cell	State of Utah
WA	(Dawn) Ford Site	State of Washington
WA	(Dawn) Ford Site	Dawn Mining Company
WA	(WHI) Sherwood Site	Washington State Department of Health and Environment
WA	(WHI) Sherwood Site	State of Washington
WA	(WHI) Sherwood Site	Bureau of Indian Affairs for the Sponkane Tribe of Indians.
WA	Hanford Site	Planning Advisory Board
WA	Hanford Site	U.S. Fish and Wildlife Service
WA	Hanford Site	Tribal Governments
WV	Parkersburg Site (Amax)	State of West Virginia
WV	Parkersburg Site (Amax)	AMAX
WY	(ANC) Gas Hills Site	Surrounding Communities
WY	(ANC) Gas Hills Site	Wyoming Department of Environmental Quality
WY	(ANC) Gas Hills Site	American Nuclear Corporation (ANC)
WY	(ANC) Gas Hills Site	State of Wyoming
WY	(Exxon) Highlands Site	State of Wyoming
WY	(Exxon) Highlands Site	Surrounding Communities
WY	(Exxon) Highlands Site	Exxon Mobile Corporation
WY	(Kennecott) Sweetwater Site-	State of Wyoming
WY	(Kennecott) Sweetwater Site-	Kennecott Uranium Company
WY	(UMETCO) Gas Hills Site	State of Wyoming
WY	(UMETCO) Gas Hills Site	Wyoming Department of Environmental Quality
WY	Hoe Creek Underground Coal Gasification Site	Bureau of Land Management (BLM)
WY	Hoe Creek Underground Coal Gasification Site	Surrounding Communities
WY	Hoe Creek Underground Coal Gasification Site	State of Wyoming
WY	Hoe Creek Underground Coal Gasification Site	Adjacent Landowners
WY	Hoe Creek Underground Coal Gasification Site	Wyoming Department of Environmental Quality
WY	Naval Petroleum Reserve No. 3 Landfill / Landfarm	State of Wyoming

APPENDIX G: SITE GEOGRAPHIC DATA

State	Site	Description
AK	Amchitka Island	Amchitka Island is the southernmost island of the Rat Island Group in the Aleutian chain and is about 2,300 kilometers (1,400 miles) southwest of Anchorage. Amchitka Island is currently part of the Alaska Martine National Widelife Refuge and is managed by the U.S. Fish and Wildlife Service.
AZ	Monument Valley, AZ	The former Monument Valley mill and tailings site is located on Navajo Nation land 21 kilometers (13 miles) east of Monument Valley Tribal Park, Arizona, 8 kilometers (5 miles) south of the Utah-Arizona border. The current mission of the site is remediation and monitoring of the groundwater.
AZ	Tuba City, AZ	The Tuba City site is located in northern Arizona 9 kilometers (5.5 miles) east of Tuba City in Coconino County, Arizona, and 137 kilometers (85 miles) north of Flagstaff. It is the location of a disposal cell and a former uranium milling site. The site is semi-arid and desert-like. The current mission is long-term monitoring and surveillance of the disposal site.
CA	Lawrence Berkeley National Laboratory	The 82-hectare (200-acre) Lawrence Berkeley National Laboratory (LBNL) site is located on the western side of the Berkeley Hills adjacent to the Berkeley Campus of the University of California. The western three-quarters of the site are located in the City of Berkley, and the eastern quarter is located in the City of Oakland. The laboratory, which is about 3.2 kilometers (two miles) east of the San Francisco Bay. The Laboratory is a secured facility and access is restricted to employees and registered guests. Entrance to the facility requires passage through gates managed by security personnel. In addition to the above restrictions, institutional controls that are currently in place include: posting of signs where workers may be exposed to contamination; maintaining drums of contaminated soils awaiting analytical results in a secured enclosure; and locked groundwater monitoring well heads, with access restricted to authorized environmental restoration staff. Engineering controls include the operation of groundwater treatment systems.
CA	Lawrence Livermore National Laboratory - Main Site	The Main Site, also known as the Livermore Site, is a 260-hectare (642-acre) site located approximately 80 kilometers (50 miles) east of San Francisco and 6.4 kilometers (4 miles) from downtown Livermore. The one-square-mile Lawrence Livermore National Laboratory (LLNL) site is an active multi-program research laboratory operated by the University of California for the U.S. Department of Energy. A number of research and support operations at LLNL handle, generate, or manage hazardous materials that include radioactive wastes. Hazardous waste treatment activities are carried out on site. The site first was used as a Naval Air Station in the 1940s. In 1951, it was transferred to the U.S. Atomic Energy Commission and was established as a nuclear weapons and magnetic fusion energy research facility.
CA	Lawrence Livermore National Laboratory - Site 300	LLNL- Site 300 is approximately 24 kilometers (15 miles) southeast of the Laboratory's Main Site. The site was developed in the 1950s as a research facility. It is operated by the University of California for the U.S. Department of Energy (DOE) primarily as a high-explosives and materials testing site in support of nuclear weapons research.
CA	Sandia National Laboratories - CA	Sandia National Laboratories/California is located in Alameda County, California, approximately 64 kilometers (40 miles) east of San Francisco in the Livermore Valley, and it sboundaries start approximaetly five kilometers (three miles) east of the Livermore City Center.

State	Site	Description
CA	Stanford Linear Accelerator Center	The 172-hectare (426-acre) Stanford Linear Accelerator Center (SLAC) is located on the San Francisco Peninsula between San Francisco and San Jose, California.
CO	(Cotter) Canon City Site	The site is located approximately 3 kilometers (2 miles) southwest of Canon City and 65 kilometers (40 miles) northwest of Pueblo.
CO	(HECLA) Durita Site	The site is located in Montrose County approximately 5 kilometers (3 miles) west of the town of Nurita.
CO	(UMETCO) Maybell Site 2	The site is in Moffat County, CO. about 6.4 kilometers (4 miles) northeast of the town of Maybell.
CO	(UMETCO) Uravan Site	The site is in Montrose County, Colorado approximately 21 kilometers (13 miles) northwest of the town of Nucla and 145 kilometers (90 miles) southwest of the Grand Junction. The site boundary currently comproses 182 hectares (450 acres).
CO	Bodo Canyon Cell	The Bodo Canyon Cell is Located in La Plata County approximately 5.6 kilometers (3.5 miles) southwest of the Town of Durango.
CO	Burro Canyon Disposal Cell	The site is located in a remote area of southwestern Colorado approximately 8 kilometers (5 miles) northeast of Slick Rock.
CO	Cheney Disposal Cell	The site is located in Mesa County approximately 18 miles southeast of Grand Junction. The actual disposal cell covers 60 acres.
CO	Durango Mill	The former Durango uranium processing site is located just outside the city limits of Durango in southwest Colorado. The site is bordered on the east by the Animas River, on the north by Lightner Creek, and on the southwest by Smelter Mountain.
CO	Estes Gulch Disposal Cell	The site is located in west-central Colorado on the western slopes of the Rocky Mountains approximately 10 kilometers (6 miles) north of the town of Rifle.
CO	Fort Saint Vrain Independent Spent Fuel Storage Installation	The site is approximately 56 kilometers (35 miles) north of Denver Colorado.
CO	Grand Junction Mill 1	The site (also known as the Climax Uranium Mill) is in an industrial area of the City of Grand Junction on the north bank of the Colorado River.
CO	Grand Junction Mill 2	The facility is south of the City of Grand Junction in Mesa County along a bend of the Gunnison River.
CO	Gunnison Disposal Cell	The site is located in Gunnison County in southwestern Colorado approximately 10 kilometers, 6 miles, southeast of the town of Gunnison.
CO	Gunnison Mill	The site is located adjacent to the Gunnison County Airport southwest of the town of Gunnison.
CO	Maybell Mill Site	The Maybell mill and tailings site is located approximately 40 kilometers (25 miles) west of the Town of Craig in Moffat County, northwestern Colorado.
CO	Naturita Mill	The site is located in Montrose County approximately 3 kilometers (2 miles) northwest of the town of Naturita.
CO	Naturita Site	The site is located near the town of Uravan in western Colorado.
CO	Naval Oil Shale Reserves Site	The site is located seven miles west of Rifle in Anvil Points, Colorado.
CO	New Rifle, CO	The two inactive uranium processing sites at Rifle are located in the Colorado River Valley near the City of Rifle. The sites are approximately 3 kilometers (2 miles) apart and are referred to as the Old Rifle and New Rifle sites.

State	Site	Description
CO	Old Rifle	The two inactive uranium processing sites at Rifle are located in the Colorado River Valley near the City of Rifle. The sites are approximately 3 kilometers (2 miles) apart and are referred to as the Old Rifle and New Rifle sites.
CO	Rio Blanco Site	The Rio Blanco Test Area is located approximately 36 miles northwest of Rifle, Colorado.
CO	Rocky Flats Environmental Technology Site	The Rocky Flats Environmental Technology Site is located approximately 26 kilometers (16 miles) northwest of downtown Denver, Colorado, in Jefferson County.
CO	Rulison Site	The Rulison Test Area Site is located 22 kilometers (14 miles) southwest of Rifle, Colorado.
CO	Slick Rock Old North Continent	The Slick Rock (North Continent) Mill 1 site is located in the Dolores River Valley, 4.8 kilometers (3 miles) northwest of the old post office at Slick Rock.
CO	Slick Rock Union Carbide	The Slick Rock site is located in the Dolores River Valley, 4.8 kilometers (3 miles) northwest of the old post office at Slick Rock.
FL	Pinellas Plant	The Pinellas Plant is located 9.6 kilometers (6 miles) north of St. Petersburg in Pinellas County, Florida.
ID	Argonne National Laboratory - West	Argonne National Laboratory-West (ANL - W) is located on the southeastern portion of the Idaho National Engineering Laboratory, approximately 56 kilometers (35 miles) west of Idaho Falls, Idaho.
ID	Idaho National Engineering and Environmental Laboratory	The Idaho National Engineering and Environmental Laboratory (INEEL) occupies 890 square miles in a remote desert area in southern Idaho along the western edge of the Eastern Snake River Plain.
ID	Lowman, ID	The Lowman mill and tailings site is located approximately 117 kilometers (73 miles) northeast of Boise, Idaho, in the Boise National Forest.
IL	Argonne National Laboratory - East	Argonne National Laboratory-East (ANL-E) occupies a 607-hectare (1,500-acre) tract located approximately 24 kilometers (15 miles) southwest of metropolitan Chicago, Illinois.
IL	Fermi National Accelerator Laboratory	The Fermi National Accelerator Laboratory is located on a 2,720-hectare (6,720-acre) tract in Batavia, Illinois, approximately 48 kilometers (30 miles) west of downtown Chicago.
IL	Site A/Plot M, Palos Forest Preserve	Site A/Plot M is located within the Palos Forest Preserve in Cook County, Illinois. The site is located approximately 30 kilometers (20 miles) southwest of downtownn Chicago
KY	Paducah Gaseous Diffusion Plant	The Paducah Gaseous Diffusion Plant is located approximately 8 kilometers (5 miles) west of the City of Paducah, Kentucky.
MO	Kansas City Plant	The Kansas City Plant is part of the Bannister Federal Complex, a 120-hectare (300-acre) site 19.2 kilometers (12 miles) south of downtown Kansas City, Missouri.
MO	Weldon Spring Site	The Weldon Spring Site Remedial Action Project consists of 91.6 hectares (226 acres), approximately 48 kilometers (30 miles) west of St. Louis, Missouri. The site consists of two main areas, the Weldon Spring Chemical Plant and the Weldon Spring Quarry.
MO	Westlake Disposal Site	The site is located near St. Louis along the floodplain of the Missouri River and adjacent to agricultural lands. The 81-hectare (200-acre) site has been used since 1962 for disposing of municipal refuse, industrial solid and liquid wastes, and construction demolition debris.
MS	Salmon Site	The Salmon Site is located 34 kilometers (21 miles) southwest of Hattiesburg, Mississippi.

State	Site	Description
NE	Hallam Nuclear Power Facility	The Hallam Nuclear Power Facility is located on a small portion of the Sheldon Power Station in Lancaster County, Nebraska, approximately 30 kilometers (19 miles) south of Lincoln, Nebraska.
NJ	Princeton Plasma Physics Laboratory	The Princeton Plasma Physics Laboratory (PPPL) is located on 88.5 acres of property leased from Princeton University on Site C and Site D of the James Forrestal Campus, in Plainsboro Township, Middlesex County, New Jersey. The Laboratory operates several devices, including the National Spherical Torus Experiment on Princeton Universities Campus. The Tokamak Fusion Test Reactor, which achieved world-record energy output, is currently undergoing dismantement and will be completed by 2003. Other site facilities include maintenance shops, warehouses, transformer yards, storage buildings, administrative offices, educational facilities, and miscellaneous trailers.
NM	(Homestake) Grant Site	The site is privately owned and operated by Homestake Mining Company in a rural area of northern New Mexico north of the town of Grant.
NM	(Quivira) Ambrosia Lake Site 2	A former uranium milling site located in the town of Ambrosia Lake, NM. north of the town of Grants. The mill occupied 2000 acres. The site contains a 350 acre engineered disposal cell. The current mission of the site is to complete its remediation activities and to close the site.
NM	(SOHIO) LBAR Site	The site is in a remote area of Cibola County east of the town of Cebolleta and north of the Laguna Reservation. Albuquerque is 45 miles east.
NM	(UNC) Church Rock Site	The site is located in McKinley County, New Mexico approximately 27 kilometers (17 miles) northeast of Gallup. The site is owned by UNC. The closest residence to the site is 2.4 kilometers (17 miles) to the north. The border of the Navajo Nation lies one half mile to the north of the Church Rock Site. The 259-hectare (640 acre) site includes an ore processing mill on about 10-hectares (25 acres) and an unlined tailings pond on about 40 hectares (100 acres).
NM	Ambrosia Lake Site	The former Ambrosia Lake mill and tailings site is located in McKinley County in northwest New Mexico approximately 40 kilometers (25 miles) north of Grants and 137 kilometers (85 miles) northwest of Albuquerque. The site is located on a 116 hectare (288 acre) tract of land in McKinley County in northwest New Mexico, approximately 40 kilometers (25 miles) north of Grants and 114 kilometers (85 miles) northwest of Albuquerque. The immediate area surrounding the Ambrosia Lake Site is sparsely populated. The site is within the Ambrosia Lake Mining District, near the center of the Grants Mineral Belt. Decommissioned uranium milling sites, abandoned underground mines, mine shafts, and ore piles are located near the site.
NM	Bayo Canyon	The Bayo Canyon site is located in the bottom of Bayo Canyon approximately five kilometers (three miles) east of the City of Los Alamos, on the border of Los Alamos and Santa Fe counties and is bounded by Kwage Mesa to the south and Otowi Mesa to the north. It is about 62 miles north-northeast of Albuquerque and 25 miles northwest of Santa Fe.
NM	Bluewater Site (Arco Bluewater)	The site is in west-central New Mexico approximately 14 kilometers (9 miles) northwest of the City of Grants, and about 2.4 kilometers (1.5 miles) northeast of the village of Bluewater.
NM	Gasbuggy Site	The Project Gas Buggy Test Area is located approximately 88 kilometers (55 miles) east of Farmington, New Mexico.

State	Site	Description
NM	Gnome-Coach Site	The Project Gnome Coach test was conducted in bedded salt approximately 50 kilometers (31 miles) southeast of Carlsbad, New Mexico and approximately eight kilometers (five miles) of the U. S. Department of Energy's (DOE's) Waste Isolation Pilot Plant (WIPP).
NM	Los Alamos National Laboratory	Los Alamos National Laboratory and the neighboring residential areas of Los Alamos and White Rock are located predominantly in Los Alamos County, north-central New Mexico, approximately 96 kilometers (60 miles) north-northeast of Albuquerque and 40 kilometers (25 miles) northwest of Santa Fe. The nearest neighboring communities include the adjacent towns of Los Alamos, and White Rock, and the pueblos of San Ildefonso, Jemez, Santa Clara, and Cochiti.
NM	Lovelace Respiratory Research Institute	The Lovelace Respiratory Research Institute (LRRI) formerly the Inhalation Toxicology Research Institute (ITRI) is located on Kirtland Airforce Base in north-central New Mexico, approximately 16 kilometers (10 miles) southeast of downtown Albuquerque, New Mexico. The LLRI formerly the Inhalation Toxicology Research Institutes conducts research for the U. S. Department of Energy (DOE) on the effects of inhaling airborne contaminants (radioactive and other energy-related pollutants). The sit is located on land that the U. S. Air Force leases to DOE under a cooperative agreement.
NM	Sandia National Laboratories - NM	Sandia National Laboratories/New Mexico is located entirely within Kirtland Air Force Base, in Bernalillo County, 10.4 kilometers (6.5 miles) east of downtown Albuquerque. The laboratory consit of five technical areas and several remote areas covering 2,820 acres in the eastern alf of the 118 square miles Kirtland AirForce Base (KAFB). The base is situated on two broad mesas bisected by the Tijers Arroyo and is bound by the Manzano Mountains to the East and the Rio Grande to the West.
NM	Shiprock Site	The former Shiprock site is located on a 42-hectare (105-acre) tract of Navajo Nation land, south of the San Juan River and adjacent to the town of Shiprock, New Mexico.
NM	Waste Isolation Pilot Plant	Located in the remote Chihuahuan Desert of southeastern New Mexico, 26 miles east of Carlsbad, project facilities include disposal rooms excavated 2,150 feet underground in an ancient, stable salt formation.
NV	Central Nevada Test Area	The central Nevada Test Site (CNTS) is located in south central Nevada, 97 kilometers (60 miles) northeast of the City of Tonopah.
NV	Nevada Test Site and Tonapah Test Range	The Nevada Test Site (NTS) is located approximately 104 kilometers (65 miles) northwest of Las Vegas. The Tonopah Test Range is north of the NTS approximately 240 kilometers (150 miles) northwest of Las Vegas. The site encompasses 3,561 square kilometers (approximately 1,375 square miles) of desert and mountainous terrain and is surrounded on three sides by the Nellis Air Force Range, which provides a substantial buffer between the site and public lands. The Tonopah Test Range, an Air Force munitions range and research and development site, is located north of the Nevada Test Site approximately 240 kilometers (150 miles) northwest of Las Vegas, Nevada. The Tonopah Test Range comprises 1,616 square kilometers (624 square miles) and is also surrounded on three sides by the Nellis Air Force Range and to the north by Bureau of Land Management open range. The majority of the Nevada Test Site and the Tonopah Test Range are located in Nye County, Nevada. This land area has been withdrawn from all forms of appropriation under public land laws.

State	Site	Description
NV	Project Shoal	Project Shoal is located approximately 48 kilometers (30 miles) southeast of Fallon, Nevada.
NY	Brookhaven National Laboratory	Brookhaven National Laboratory is located on approximately 2153hectares (5263 acres) of land, and is located on Long Island in Upton, New York, approximately 120 kilometers (75 miles) from New York City.
NY	Separations Process Research Unit	The unit is located approximately 3.2 kilomenters (2 miles) east of Schenectady, New York.
NY	West Valley Demonstration Project	The West Valley Demonstration Project (WVDP) is located approximately 48 kilometers (30 miles) south of Buffalo, New York.
OH	Ashtabula Environmental Management Project	The Ashtabula Site (formerly known as Reactive Metals, Inc.) is located in northern Ashtabula County, Ohio, about 5 kilometers (three miles) northeast of the center of the City of Ashtabula and approximately one mile south of Lake Erie.
OH	Fernald Environmental Management Project	The U.S. Department of Energy's Fernald Environmental Management Project (FEMP) is located between Hamilton and Butler Counties near the southwest corner of Ohio. The site is approximately 27 kilometers (17 miles) northwest of Cincinnati.
OH	Miamisburg Environmental Management Project	The Mound Plant is located in Miamisburg, Ohio, approximately 16 kilometers (10 miles) south-southwest of Dayton, Ohio. It is a 306-acre site located approximately 2,000 feet east of the Great Miami River and partially overlying the Buried Valley Aquifer (BVA), a designated sole source aquifer. Most of the 124-hectare (306 acre) site overlooks the city from a ridge that extends toward downtown Miamisburg from the southern city limits. Mound Road, on the east side of the plant, is lined by residences and provides access to the plant's main gate. A Contail freight line runs along MEMP's western border, and the old Miami-Erie Canal bed runs west of the track. Approximately half a mile farther west from the MEMP is the Great Miami River.
OH	Piqua Nuclear Power Facility	The Piqua Nuclear Power Facility is located on the bank of the Great Miami River in the town of Piqua, Ohio, approximately 55 kilometers (34 miles) north of Dayton. It is situated on land owned by the U.S. Department of Energy (DOE) about 274 meters (900 feet) southeast of the Piqua Municipal Power station near the Great Miami River. The North and East sides of the decommissioned facility are bounded by a limestone quarry owned by Armco Steel Company.
OH	Portsmouth Gaseous Diffusion Plant	The Portsmouth Gaseous Diffusion Plant is located on a 1,497 hectare (3,714 acre) reservation owned by DOE, in south central Ohio, approximately 32 kilometers (20 miles) north of Portsmouth, Ohio, and 112 kilometers (70 miles) south of Columbus, Ohio and 6.5 kilometers (4 miles) west of the Village of Piketon.
OR	Lakeview Mill	The mill is located about two kilometers (one mile) north of Lakeview and approximately 26 kilometers (16 miles) north of the California-Oregon border.
OR	Lakeview Site	The mill is located about eleven kilometers (seven miles) northwest of Lakeview and 11kilometers (7 miles) north of the Lakeview Mill.
PA	Burrell Site	The site is in Burrell Township in southwestern Pennsylvania.
PA	Canonsburg, PA	The Canonsburg site is within the Borough of Canonsburg, Washington County, in southwestern Pennsylvania, approximately 32 kilometers (20 miles) southwest of downtown Pittsburgh.

State	Site	Description
PR	Center for Energy and Environmental Research	The Center for Energy and Environment Research, located in the Commonwealth of Puerto Rico, consists of three sites and a decommissioned research reactor. These sites include the Mayaguez Site, the El Verde Research Area, and the Rio Piedras Site.
SC	Savannah River Site	The Savannah River Site (SRS) is located in west-central South Carolina and is bordered on the south west by the Savannah River.
SD	Edgemont Site	The site is located in the southwest corner of South Dakota and is about 5 kilometers (three miles) south of the town of Edgemont.
TN	Oak Ridge Reservation	Oak Ridge Reservation is located almost entirely within the city limits of Oak Ridge in eastern Tennessee. It lies in a valley between the Cumberland and the Blue Ridge mountain ranges and is bordered on two sides by the Clinch River. It is about 40 kilometers (25 miles) west of Knoxville.
TX	(Chevron) Panna Maria Site	The site is located in Karnes County in southern Texas.
TX	(Conoco) Conquista Site	The site is located in Karnes County, Texas southwest of Falls City. Total site area is 243 hectares (600 acres) and has an onsite, 101-hectare (250-acre) mill tailings disposal cell.
TX	(Exxon) Ray Point Site	The site is located near the town of Ray Point approximately 113 kilometers (70 miles) southeast of San Antonio.
TX	Falls City Site	The former Falls City mill and tailings site is located in Karnes County, 74 kilometers (46 miles) southeast of San Antonio and approximately 13 kilometers (8 miles) southwest of Falls City, Texas.
TX	Pantex Plant	Pantex Plant is located in the Texas panhandle, approximately 27 kilometers (17 miles) northeast of downtown Amarillo.
UT	(EFN) White Mesa Site	The site is in San Juan County approximately eight kilometers (five miles) south of Blanding.
UT	(Plateau) Shootaring Canyon Site	The site is near Ticaboo, UT about 18 kilometers (11 miles) north of Lake Powell.
UT	(Rio Algom) Lisbon Valley Site	The site is located in rural southeast Utah south of the City of Moab.
UT	11e(2) Disposal Site	The site is located 137 kilometers (85 miles) west of Salt Lake City and 4 kilometers (2.5 miles) south of US Interstate 80 in Tooele County.
UT	Atlas Moab Mill	This is on the Northwest shore of the Colorado River approximately 5 kilometers (3 miles) from Moab.
UT	Green River Site	The former Green River mill and tailings site is located in the east-central portion of Utah in Grand County, 113 kilometers (70 miles) west of the Utah-Colorado border.
UT	Mexican Hat, UT	The former Mexican Hat mill and tailings site is located on Navajo Nation land at Halchita, Utah, about 2.4 kilometers (1.5 miles) southwest of Mexican Hat, Utah.
UT	Monticello Mill Site and Vicinity Properties	Monticello Mill Tailings site and the Monticello Vicinity Properties are located near the City of Monticello in San Juan County, Utah.
UT	Salt Lake City Mill	The Salt Lake City site is located about 6.4 kilometers (4 miles) south-southwest of the center of Salt Lake City.
UT	South Clive Disposal Cell	The site is located approximately 137 kilometers (85 miles) west of Salt Lake City and 4 kilometers (2.5 miles) south of US Interstate 80.
WA	(Dawn) Ford Site	The site is located in Ford Washington on the eastern border of the Spokane Indian Reservation.
WA	(WHI) Sherwood Site	The site is located near the town of Wellpinit in western Washington State on the Spokane Indian Reservation.

State	Site	Description
WA	Hanford Site	The Hanford site is located in the southeastern part of the State of Washington
WV	Parkersburg Site (Amax)	The site is located eight miles southwest of Parkersburg, WV.
WY	(ANC) Gas Hills Site	The site is located in Gas Hills, WY approximately 137 kilometers (85 miles) west of Caspar. The site is the location of a former uranium mill that operated from 1959 until 1994.
WY	(Exxon) Highlands Site	The site is in Converse County, WY in the Powder River Basin 40 miles northeast of Glen Rock. The site is the location of a former uranium mine and mill and has a 69-hectare (170-acre) onsite disposal cell for wastes generated during uranium milling operations.
WY	(Kennecott) Sweetwater Site-	The site is in Sweetwater County, WY and is about 64 kilometers, 40 miles, northwest of Rawlins and is owned by the Kennecott Uranium Company. The site contains a 60 acre disposal cell containing byproduct material generated from processing uranium ores during its two years of operation.
WY	(Pathfinder) Lucky Mc Site	The site is located in the Gas Hills Uranium Mining District west of Casper, WY.
WY	(Pathfinder) Shirley Basin Site 1	The site is in a remote area of Carbon County 88.5 kilometers (55 miles) south of Casper.
WY	(Petrotomics) Shirley Basin Site 2	The site is in a remote area of Carbon County 88.5 kilometers (55 miles) south of Casper.
WY	(UMETCO) Gas Hills Site	The site is in the East Gas Hills area of Central Wyoming approximately 80.4 kilometers (50 miles) southeast of Riverton.
WY	(Union Pacific) Bear Creek Site	The site is north of the town of Douglas which is 80.5 kilometers (50 miles) east of Casper.
WY	(WNI) Split Rock Site	The site is two miles northeast of the town of Jeffrey City, WY.
WY	Hoe Creek Underground Coal Gasification Site	The site is located on 80 acres of private land in Campbell County, WY near the town of Gillette.
WY	Naval Petroleum Reserve No. 3 Landfill / Landfarm	The site is located 56 kilometers (35 miles) north of Casper, WY and is being used to produce petroleum for commercial production. The site is owned by DOE.
WY	Riverton Site	The Riverton mill site and tailings pile is located 4 kilometers (2.5 miles) southwest of the center of Riverton on the north side of State Highway 789 in Fremont County, Wyoming.
WY	Rock Springs Oil Shale Retort Site	The site is seven miles west of Rock Springs in Sweetwater County.
WY	Spook Site	The former Spook mill and tailings site is located approximately 77 kilometers (48 miles) northeast of Casper, Wyoming, in Converse County, and 51 kilometers (32 miles) northeast of Glenrock, Wyoming.

APPENDIX H: GLOSSARY

Active Long-Term Stewardship: The direct performance of continuous or periodic custodial activities, such as controlling access to a site by means other than passive institutional controls, controlling or cleaning up releases from a site, performing maintenance operations on remediated areas at a site, or monitoring performance parameters at a disposal or release site.

Activity: The rate at which radioactive material emits radiation. Stated in terms of the number of nuclear disintegrations occurring in a unit of time, the common unit of radioactivity is the curie (Ci).

Agricultural Land Use: Unfenced areas where subsistence or commercial agriculture predominates without any restrictions on surface or groundwater use.

Atomic Energy Act: The Federal law created in 1946 to create a virtual monopoly on uses of nuclear energy and information within the U. S. Atomic Energy Commission. Substantially amended in 1954 to promote and regulate the production and uses of atomic power, with minor amendments since then.

Atomic Energy Commission (AEA): The Federal agency created by the United States Congress in 1946 (through the Atomic Energy Act) as the civilian agency responsible for uses of nuclear energy, including development of nuclear weapons. It also regulated the private use of radioactive materials and promoted energy development. In 1974, its weapons production and research activities were transferred to the Energy Research and Development Administration (ERDA), and its regulatory responsibility was given to the new Nuclear Regulatory Commission (see Energy Reorganization Act of 1974). The functions of ERDA were transferred to the U. S. Department of Energy in 1977.

***Background Concentration*:** The concentration of a substance in an environmental media (air, water, or soil) that occurs naturally and is not the result of human activities.

Base Case: The estimated total program cost (i. e. , reported in the 1995 and 1996 Baseline Environmental Management Reports) that reflects the most likely activities and schedule under current projections.

Berm: A mound or wall of earth; a narrow shelf, path, or ledge typically at the top or bottom of a slope.

***Biodegradation*:** The breakdown of a substance by living things (as microorganisms) into innocuous products.

Burial Grounds: Areas designated for near surface disposal of containers of low-level radioactive waste and obsolete or worn-out radioactively contaminated equipment.

Byproduct: Radioactive material from producing or processing nuclear materials. Some waste, materials, and contaminated media have beneficial commercial uses.

Canyon: A vernacular term for a chemical separations plant, inspired by the plant's long, high, narrow structure (e. g. , the Savannah River Site's F and H Canyons). However, not all chemical separations plants are canyons.

Characterization: Sampling, monitoring, and analysis activities to determine the extent and nature of contamination at a facility or site. Characterization provides the necessary technical information to develop, screen, analyze, and select appropriate cleanup techniques.

Clean Closure: Closure of a site by removal or decontamination of contaminated materials. All hazardous wastes have been removed from a given Resource Conservation and Recovery Act (RCRA) regulated unit and any releases at or from the unit have been remediated so that further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment. As part of meeting the clean closure performance standard, facility owners/ operators must remove all wastes from the closing unit and remove or decontaminate groundwater and any other environmental media contaminated by releases from the closing unit), all waste residues, contaminated containment system components, contaminated soils (including and structures and equipment contaminated with hazardous waste and hazardous waste leachate to the extent necessary to protect human health and the environment.

Cleanup: The process of addressing contaminated land, facilities, and materials in accordance with applicable requirements. Cleanup does not imply that all hazards will be removed from the site. The term "remediation" is often used synonymously with cleanup. See also "environmental restoration. "

Cocooning: (See Entombing).

Cold War Mortgage: The cost and effort associated with addressing the environmental legacy of 50 years of nuclear weapons production.

Completion of Cleanup: A condition in which cleanup of a site is considered complete or when deactivation or decommissioning of all facilities currently in the Environmental Management program has been complete, excluding any longterm surveillance and monitoring; all releases to the environment have been cleaned up in accordance with agreed-upon cleanup standards; groundwater contamination has been contained or long-term treatment or monitoring is place; nuclear material and spent fuel have been stabilized and/or placed in safe long-term storage; and "legacy" waste (i. e, waste produced by past nuclear weapons production activities, with the exception of high-level waste) has been disposed of in an approved manner.

Compliance Agreement: Legally binding agreement between regulators and regulated entities that sets standards and schedules for compliance with environmental statutes.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Public Law 96-510, 42 U. S. C. 9601 et seq. : a Federal law (also known as Superfund), enacted in 1980 and reauthorized in 1986, that provides the legal authority for emergency response and cleanup of hazardous substances released into the environment and for the cleanup of inactive waste sites.

Comprehensive Land Use Planning: A required site planning and management system to develop and maintain current and future land use plans and any type of development, use, or disposal planning for the site. Stakeholders are involved in development of Comprehensive Land Use Plans.

Consent Decree: A legally binding document that delineates actions previously agreed upon by the parties. In the case of DOE, a Consent Order outlines planned DOE actions to remediate environmental problems in return for the other party's consent to cease litigation.

Constant Dollars: A term that represents a dollar value adjusted for changes in prices. Dollars in the future are adjusted to strip out inflation by dividing current dollar amounts by an appropriate index, a process known as deflating. The result is a constant dollar series as it would exist if prices and transactions were the same in all subsequent years as the base year. Any changes in such a series would reflect only changes in the real volume of goods and services. This Report's cost projections are in thousands of constant 2000 dollars.

Contaminant: Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Contaminant of Concern: Radionuclide or non radionuclide contaminants that pose a risk to human health or the environment and are addressed by the remedial alternatives.

Controlled Access Land Use: DOE maintains restricted access for secure storage or disposal of nuclear materials or waste. Barriers and security fences prevent access by unauthorized persons. Wildlife and plants are controlled or removed.

Curie (Ci): A unit of radioactivity equal to 37 billion disintegrations per second (i. e. , 37 billion becquerels); also a quantity of any radionuclide / radionuclides having one curie of radioactivity.

Decommissioning: Retirement of a nuclear facility, including decontamination and/or dismantlement.

Decontamination: Removal of radioactive or hazardous contamination by a chemical or mechanical process.

Disposal Cell: An engineered unit or waste disposal and containment structure that is designed to safely store waste for extended periods and prevent escape of contaminants to the surrounding environment. The disposal cell may include a multi-layered cover which inhibits the escape of contaminants, prevents wind and water erosion of the contaminated materials in the cell, and prevents precipitation from percolating through the waste.

DNAPLs: An acronym for dense, non-aqueous phase liquids. DNAPLs are composed of one or more organic contaminants, do not mix with water, and are denser than water. The most common DNAPLs contaminants in groundwater are chlorinated solvents.

Department of Energy (DOE): The cabinet-level U. S. Government agency responsible for nuclear weapons production, energy research, isotope production, and the cleanup of hazardous and radioactive waste at it sites. It was created from the Energy Research and Development Administration and other Federal Government functions in 1977.

DOE Office of Environmental Management: An office of DOE that was created in 1989 to oversee the Department's waste management and environmental cleanup efforts. Originally called the Office of Environmental Restoration and Waste Management, it was renamed in 1993.

Disposition: Recycling and reuse, sale, transfer, storage, treatment, or disposal.

Encapsulation: A process whereby waste is placed and sealed in casks, cans, or other containers to prevent the material from moving through the environment.

End State: The physical state of a site after agreed upon remediation activities have been completed.

Energy Reorganization Act of 1974: The Federal law that divided the Atomic Energy Commission (AEC) into the Energy Research and Development Agency (ERDA) and the Nuclear Regulatory Commission (NRC). The weapons and research portions of AEC were transferred to ERDA and later merged into DOE (1977). The regulatory aspects of AEC were assigned to the Nuclear Regulatory Commission.

Engineered Controls: Includes radioactive, hazardous, and sanitary landfills; vaults; repositories; in-situ stabilization; caps on residual contamination; or other man-made controls designed to isolate or to contain waste or materials.

Engineered Units: Includes radioactive, hazardous, and sanitary landfills; vaults; tank farms; and other units with manmade containment systems.

Enriched Uranium: Uranium that, as a result of the process of enrichment, has more uranium-235 than natural uranium.

***Entombment*:** An alternative for dispositioning surplus facilities by burial or covering in a vault.

Environmental Contamination: The release into the environment of radioactive, hazardous, or toxic materials.

Environmental Impact Statement (EIS): The detailed written statement that is required by Section 102(2)(C) of the *National Environmental Policy Act (NEPA)* for a proposed major Federal action that could significantly affect the quality of the human environment. A DOE EIS is prepared in accordance with applicable requirements of the Council on Environmental Quality's *NEPA* regulations in 40 CFR Parts 1500-1508, and the DOE *NEPA* regulations in 10 CFR 102 1. The statement includes, among other information, discussions of the environmental impacts of the proposed action and all reasonable alternatives, adverse environmental effects that cannot be avoided should the proposal be implemented, the relationship between short-term uses of the human environment and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources.

Environmental Protection Agency: A Federal agency established in 1970 to enforce environmental laws, including the Resource Conservation and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act; and the Toxic Substances Control Act.

Environmental Restoration: Often described broadly as "cleanup," this function encompasses a wide range of activities, such as stabilizing contaminated soil; treating groundwater; decommissioning process buildings, nuclear reactors, chemical separations plants, and many other facilities; and exhuming sludge and buried drums of waste.

Feasibility Study: An analysis of the practicality of a proposal, such as a description and analysis of the potential cleanup alternatives for a site. The Feasibility Study emphasizes data analysis and usually recommends selecting a cost-effective alternative. It is usually performed with and uses physical engineering measures, such as treatment and containment systems.

Federal Facility Agreement: A type of compliance agreement under Section 120 of the *Comprehensive Environmental Response, Compensation, and Liability Act*, which requires written interagency agreements for compliance activities between the U. S. Department of Energy and the U. S. Environmental Protection Agency.

Finding of Suitability for Transfer (FOST).

FOST determines that the property is suitable for transfer by deed for the intended purpose, if known, because the requirements of *CERCLA* Section 120(h)(3) have been met for the property, taking into account the potential risk of future liability.

Fiscal Year: A 12-month period for which an organization plans the use of its funds. In the Federal Government this period extends from October 1 through September 30 of the following calendar year. Fiscal year is commonly denoted by its abbreviation "FY. " ***Fissile***: Capable of being split by a low-energy neutron. The most common fissile isotopes are uranium-235 and plutonium-239.

Formerly Utilized Sites Remedial Action Program (FUSRAP): A Federal program initiated in 1974 to identify and remediate sites around the country that were contaminated during the 1940s and 1950s as a result of researching, developing, processing, and producing uranium and thorium, and storing the subsequent processing residues. In October 1997, the Energy and Water Development Appropriations Act for fiscal year 1998 transferred responsibility for the administration and execution of the FUSRAP program from DOE to the U. S.

Army Corps of Engineers. At the time of transfer on October 13, 1997, DOE had completed the cleanup of 25 of the 46 FUSRAP sites.

French Drain: A drainage pipe.

Funding Organization: Agency which provides financial support for stewardship activities.

Gaseous Diffusion: The process used in the United States to enrich uranium-235 so that it is usable in weapons production and nuclear energy.

Half-Life: The time it takes for one-half of any given number of unstable atoms to decay to another nuclear form. Each isotope has its own characteristic half-life. They range from millionths of a second to billions of years.

Hazard: Materials or conditions that have the potential to cause adverse effects to health, safety, or the environment.

Hazardous Waste: A category of waste regulated under the *Resource Conservation and Recovery Act* (*RCRA*, 42 U. S. C. 6901 et seq.). To be considered hazardous, a waste must be solid waste under *RCRA* and must exhibit at least one of four characteristics described in 40 CFR 261. 20 through *GL-5 Volume I – Final Report January 2001* 40 CFR 261. 24 (i. e. , ignitability, corrosivity,

reactivity, or toxicity) or be specifically listed by the Environmental Protection Agency in 40 CFR 261. 31 through 40 CFR 261. 33. Source, special nuclear, or byproduct materials, as defined by the *Atomic Energy Act,* are not hazardous waste because they are not defined as solid waste under *RCRA*.

High-Level Waste (HLW): Highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid materials derived from such liquid waste that contains fission products in sufficient concentrations; and other highly radioactive material that is determined, consistent with existing law, to require permanent isolation.

Highly Enriched Uranium: Uranium with more than 20 percent of the uranium-235 isotope, used for making nuclear weapons and also as fuel for some isotope production, research, and power reactors. Weapons-grade uranium is a subset of this group.

Holding Pond: A structure built to contain large volumes of liquid waste to ensure that it meets environmental requirements prior to release.

Hot Cells: Heavily shielded compartments in which highly radioactive material can be handled, generally by remote control.

In-Situ: In its natural position or place.

Institutional Controls: Non-engineering measures – usually, but not always, legal controls – intended to affect human activities in such a way as to prevent or to reduce exposure to hazardous substances. Institutional controls include, but are not necessarily limited to: land and resource (e. g. , water) use and deed restrictions; well-drilling prohibitions; building permits; and well use advisories and deed notices; and other legally enforceable measures. However, they are distinct from physical engineering measures, such as treatment and containment systems.

Isotopes: Any of two or more variations of an element in which the nuclei have the same number of protons (i. e. , the same atomic number) but different numbers of neutrons so that their atomic masses differ. Isotopes of a single element possess almost identical chemical properties but often different physical properties (i. e. , carbon-12 and - 13 are stable, while carbon-14 is radioactive).

Land Use: The ultimate uses to be permitted for currently contaminated lands, waters, and structures at each Department of Energy installation.

Land Use Control Assurance Plan (LUCAP): A written installation-wide plan that sets out the procedure to assure that land use controls remain effective over the long-term for all areas at the particular installation where they are required.

Landlord Activities: Activities that involve the physical operation and maintenance of DOE installations. Specific tasks vary but generally include providing utilities, maintenance, and general infrastructure for the entire installation.

Legacy Waste: Any waste within a complex that was generated by past weapons production or research activities and is in storage awaiting treatment or disposal.

Life-Cycle Cost Estimate: All the anticipated costs associated with a project or program alternative throughout its life. This includes costs from pre-operations through operations or to the end of the alternative.

Long-Term Stewardship: Encompasses all activities required to maintain an adequate level of protection to human health and the environment posed by nuclear and/or chemical materials, waste, and residual contamination remaining after cleanup is complete.

Low-Level Waste (LLW): Low-level radioactive waste is radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, byproduct material (as defined in Section 11e. (2) *of* the *Atomic Energy Act of 1954,* as amended), or naturally occurring radioactive material.

Manhattan Project: The U. S. Government project that produced the first nuclear weapons during World War II. Started in 1942, the Manhattan Project formally ended in 1946. The Hanford Site, Oak Ridge Reservation, and Los Alamos National Laboratory were created for this effort. The project was named for the Manhattan Engineer District of the U. S. Army Corps of Engineers.

Maximum Contaminant Level (MCL): The maximum permissible level of a contaminant in water delivered to any user of a public system. MCLs are enforceable standards.

Mixed Waste: Waste that contains both source, special nuclear, or byproduct material subject to the *Atomic Energy Act of 1954,* as amended, and a hazardous component subject to the *Resource Conservation and Recovery Act.*

National Environmental Policy Act of 1969 (NEPA): *NEPA* is the basic national charter for protection of the environment. It establishes policy, sets goals (in Section 101), and provides means (in Section 102) for carrying out the policy. Section 102(2) contains "action-forcing" provisions to ensure that Federal agencies follow the letter and spirit of the Act. For major Federal actions significantly affecting the quality of the human environment, Section 102(2)(C) of *NEPA* requires Federal agencies to prepare a detailed statement that includes the environmental impacts of the proposed action and alternatives and other specified information.

National Nuclear Security Administration: DOE program that is responsible for carrying out DOE responsibilities to achieve national security objectives established by the President. These include, among other things, responsibility for nuclear weapons and for assisting in reducing the global nuclear danger by planning for and maintaining a safe, secure and reliable stockpile of nuclear weapons and associated materials, capabilities, and technologies in a safe, environmentally sound, and cost-effective manner.

National Priorities List (NPL): The Environmental Protection Agency's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under *CERCLA*. The list is based primarily on the score a site receives from the EPA Hazard Ranking System described in 40 CFR Part 300, Appendix A. EPA must update the NPL at least once a year.

Natural Attenuation: Cleanup process that relies on natural processes to remediate contamination (e. g. , radioactive decay, biodegradation, dispersion, dilution, sorption, volatilization, chemical or biological stabilization, transformation, or destruction of the contaminants).

Natural Flushing: A passive groundwater remediation technique which uses natural groundwater movement and geochemical processes to decrease contaminant concentrations. Criteria for use of natural flushing require that the contaminated groundwater is not a current or potential drinking water source. (See also "natural attenuation. "*)*

Nevada Offsites: Underground nuclear tests conducted at eight locations in five different States (Alaska, Colorado, Mississippi, Nevada, and New Mexico) from 1957 to 1973. Test were part of the Plowshare program to develop peaceful (industrial and scientific) applications for nuclear explosives and the Vela Uniform program to improve the capability of detecting, monitoring, and identifying underground nuclear detonations.

No Further Action: A determination made, based upon technical evidence, that remedial action is not warranted at a given site.

Nuclear Reactor: A device that sustains a controlled nuclear fission chain reaction.

Nuclear Waste Policy Act (NWPA): The Federal law that primarily provides for the development of Federal geologic repositories for disposal of highlevel waste and spent nuclear fuel (amended several times since).

Nuclear Weapons Complex: The chain of foundries, uranium enrichment plants, reactors, chemical separation plants, factories, laboratories, *GL-7 Volume I – Final Report January 2001* assembly plants, and test sites that produced nuclear weapons. Sixteen major U. S. facilities in 12 States formed the nuclear weapons complex.

Open Space Land Use: Posted areas reserved generally as buffer or wildlife management zones. Native Americans or other authorized parties may be allowed permits for occasional surface area use. Access to or use of certain areas may be prevented by passive barriers (e. g. , where soil is capped).Limited hunting or livestock grazing may be allowed.

Operable Unit: Organizational unit used to clean up a site. It may address geographical portions of a site, specific site problems, or initial phases of an action. It may also consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site.

Owner: Entity who owns the deed to the property. In some instances, the owner leases the property to someone else, known as a landlord.

Phytoremediation: An innovative/emerging technology that utilizes plants to uptake toxic metals and radionuclides through roots in situ.

Polychlorinated Biphenyls (PCBs): A group of commercially produced organic chemicals used since the 1940s in industrial applications throughout commercial industry and the nuclear weapons complex. Polychlorinated biphenyls are found in many gaskets and large electrical transformers and capacitors in the gaseous diffusion plants and other DOE facilities. They have been proven to be toxic to both humans and laboratory animals.

Potentially Responsible Party (PRP): The *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) defines a PRP as any individual(s) or company(ies)

identified as potentially liable under CERCLA for cleanup or payment for costs of cleanup of hazardous substance sites. PRPs may include individual(s) or company(ies) identified as having owned, operated, or in some other manner contributed wastes to hazardous substance sites.

Plutonium (Pu): A heavy, radioactive, metallic element with the atomic number 94. It is produced artificially by neutron bombardment of uranium. Plutonium has 15 isotopes with atomic masses ranging from 232 to 246 and half lives from 20 minutes to 76 million years. Its most important isotope is fissile plutonium-239.

Preliminary Remediation Goals (PRGs): PRGs provide remedial design staff with long-term targets to use during analysis and selection of remedial alternatives. Ideally, such goals, if achieved, should both comply with applicable or relevant and appropriate requirements and result in residual risks that fully satisfy the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requirements for the protection of human health and the environment. By developing PRGs early in the decision-making process (before the remedial investigation/feasibility study and the baseline risk assessment are completed), design staff may be able to streamline the consideration of remedial alternatives.

Pump-and-Treat System: A system which extracts groundwater and removes contaminating substances before returning the water (e. g. , recharge in injection wells) or disposing of it elsewhere.

Production Reactor: A nuclear reactor designed to produce manmade isotopes. Tritium and plutonium are made in production reactors. The United States has 14 such reactors: nine at the Hanford Site and five at the Savannah River Site. Some research reactors are also used to produce isotopes.

Radioactive: Of, caused by, or exhibiting radioactivity.

Radioactivity: The spontaneous transformation of unstable atomic nuclei, usually accompanied by the emission of ionizing radiation.

Radioisotope or Radionuclide: An unstable isotope that undergoes spontaneous transformation and emits radiation.

Receptor: Any human or other living thing that *GL-8 Volume I – Final Report January 2001* could be exposed and/or threatened by hazardous or toxic contaminants.

Record of Decision (ROD): A public document that explains the cleanup alternatives to be used at National Priorities List sites under *CERCLA*. In addition, a ROD under *NEPA* is a concise public document that records a Federal agency's decision(s) concerning a proposed action for which the agency has prepared an environmental impact statement (EIS). The NEPA ROD is prepared in accordance with the requirements of the Council on Environmental Quality NEPA regulations (40 CFR 1505. 2) and DOE's NEPA regulations (10 CFR 1021. 315). A ROD identifies the alternatives considered by the agency and specifies the environmentally preferable alternative(s) evaluated, factors balanced by the agency in making the decision, whether all practicable means to avoid or minimize environmental harm have been adopted, and, if not, why they were not.

Recreational Land Use: Unfenced areas where daytime use for recreational activities (e. g. , hiking, biking, sports), hunting, and some overnight camping is allowed. Fishing may be limited to catch-and-release.

Remedy or Remedial Action (RA): Those actions consistent with permanent remedy taken instead of, or in addition to, removal action in the event of a release or threatened release of a hazardous substance into the environment. A remedy or RA seeks to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection (using dikes, trenches, or ditches), clay cover, neutralization, cleanup of released hazardous substances and associated contaminated materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, onsite treatment or incineration, provision of alternative water supplies, any monitoring reasonably required to assure that such actions protect the public health and welfare and the environment and, where appropriate, post-removal site control activities. The term includes the costs of permanent relocation of residents and businesses and community facilities (including the cost of providing "alternative land of equivalent value" to an Indian tribe pursuant to CERCLA Section 126(b)) where EPA determines that, alone or in combination with other measures, such relocation is more cost-effective than, and environmentally preferable to, the transportation, storage, treatment, destruction, or secure disposition offsite of such hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term includes offsite transport and offsite storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials. For the purpose of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the term also includes enforcement activities related thereto.

Remedial Investigation: The CERCLA process of gathering the data necessary to determine the nature and extent of contamination at a CERCLA site, establishing criteria for cleaning up the site, identifying preliminary alternatives for remedial action, and supporting the technical and cost analyses of the alternatives. The Remedial Investigation is usually done together with the Feasibility Study. Together, they are usually referred to as the "Remedial Investigation/ Feasibility Study. "

Residential Land Use: Unfenced areas where permanent residential use predominates. There is no restriction on surface water use, but groundwater use may be restricted.

Research Reactor: A class of nuclear reactors used to do research into nuclear physics, reactor materials and design, and nuclear medicine. Some research reactors also produce isotopes for industrial and medical use.

Residual Contamination Standards: The amount and concentrations of contaminants in soil, water, and other media that will remain following environmental management activities.

Resource Conservation and Recovery Act (RCRA): A Federal law enacted in 1976 to address the treatment, storage, and disposal of hazardous waste.

Rip Rap: A rock layer which can be used to cover disposal cells.

***Risk*:** Risk requires the presence of a hazard but, in addition to the hazard, considers the probability that the potential harm or undesirable consequences will be realized. Risk is expressed (qualitatively or quantitatively) in terms of the likelihood that an adverse effect will occur as a result of the existence of a hazard. The existence of a hazard does not automatically imply the existence of a risk since risk requires a pathway (to a receptor) for an exposure to occur. Barriers and other controls can block or eliminate the pathway and related risk from the residual hazard.

Risk (in the context of human health): The probability of injury, disease, or death from exposure to a hazard or a combination of hazards. In quantitative terms, risk is expressed in values ranging from zero (representing the certainty that harm will not occur) to one (representing certainty that harm will occur). The U. S. Environmental Protection Agency's Integrated Risk Information System expresses risk as follows: • 10^{-1} = a risk of 1/10 (one person out of 10); • 10^{-4} = a risk of 1/10,000 (one person out of 10,000); • 10^{-6} = a risk of 1/1,000,000 (one person out of 1,000,000); • 1. 3 x 10^{-3} = a risk of 1. 3/1,000 = 1/770 (one person out of 770); • 8 x 10^{-3} = a risk of 1/125 (one person out of 125); and • 1. 2 x 10^{-5} = a risk of 1/83,000 (one person out of 83,000).

Site Characterization: An onsite investigation at a known or suspected contaminated waste or release site to determine the extent and type(s) of contamination.

Sludge: Slushy matter or sediment, such as that precipitated by the treatment of waste.

Spent Nuclear Fuel (SNF): Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

Steward: Individuals or groups responsible for performing and/or ensuring that the required longterm stewardship activities take place.

Stockpile Stewardship: A DOE program to ensure core competencies in activities associated with the research, design, development, and testing of nuclear weapons. It also refers to the assessment and certification of their safety and reliability.

***Superfund Amendments and Reauthorization Act (SARA*)**: (also know as Superfund) The 1986 Act reauthorizing and amending the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Target Cleanup Level: A level of concentration of a contaminant in an environmental media (e. g. , soil, groundwater) established in a *CERCLA* Record of Decision as a level to be achieved by the selected remedy.

Toxic Substances Control Act (TSCA): A Federal law enacted in 1976 to protect human health and the environment from unreasonable risk caused by the manufacture, distribution, use, disposal of, or exposure to substances containing toxic chemicals.

Transuranic Elements: All elements beyond uranium on the periodic table; that is, all elements with an atomic number greater than 92. All transuranic elements are man-made. They include neptunium, plutonium, americium, and curium.

Transuranic Waste (TRU): Transuranic waste is radioactive waste containing more than 100 nanocuries (3700 becquerels) of alpha-emitting transuranic isotopes per gram of waste, with

halflives greater than 20 years, except for: (1) highlevel radioactive waste; (2) waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by the 40 CFR, Part 191 disposal regulations; or (3) waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR, Part 61.

Unrestricted Land Use: Unfenced areas where there is no restriction on the types of activities that may occur, including permanent residential use.

Uranium (U): A radioactive, metallic element with the atomic number 92, the heaviest naturally occurring element. Uranium has 14 known isotopes, of which uranium-238 is the most abundant in nature. Uranium-235 is commonly used as a fuel for nuclear fission.

Uranium Milling Site: A site where uranium is separated from ore taken from mines.

Uranium Mill Tailings: Tailings or waste produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content.

Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978: The Act that directed DOE to provide for stabilization and control of the uranium mill tailings from inactive uranium milling sites in a safe and environmentally sound manner to minimize radiation health hazards to the public. It authorized the U. S. Department of Energy to undertake remedial actions at 24 designated inactive uranium processing sites and at an estimated 5,048 vicinity properties.

Uranium Mill Tailings Remedial Action Project (UMTRA): A DOE program to plan, implement, and complete environmental restoration (e. g.,cleanup of contaminated surface water and groundwater) at inactive uranium-processing sites and their vicinity sites, as directed and authorized by the *Uranium Mill Tailings Radiation Control Act of 1978.*

Vitrification: A process by which waste is transformed from a liquid or sludge into an immobile solid that traps radionuclides and prevents waste from contaminating soil, groundwater, and surface water. While the process does not reduce radioactivity, it is used to solidify and stabilize certain forms of radioactive and hazardous waste. For example, borosilicate glass is used to immobilize high-level radioactive waste.

Waste Isolation Pilot Plant (WIPP): A DOE facility designed and authorized to permanently dispose of transuranic radioactive waste in a mined, underground facility in deep geologic salt beds. It is located in southeastern New Mexico, 42 kilometers (26 miles) east of the city of Carlsbad.

Waste Management: Activities that include treating, storing, and disposing of high-level radioactive waste, transuranic waste, transuranic mixed waste, low-level radioactive waste, low-level mixed waste, hazardous chemical waste, and sanitary waste.